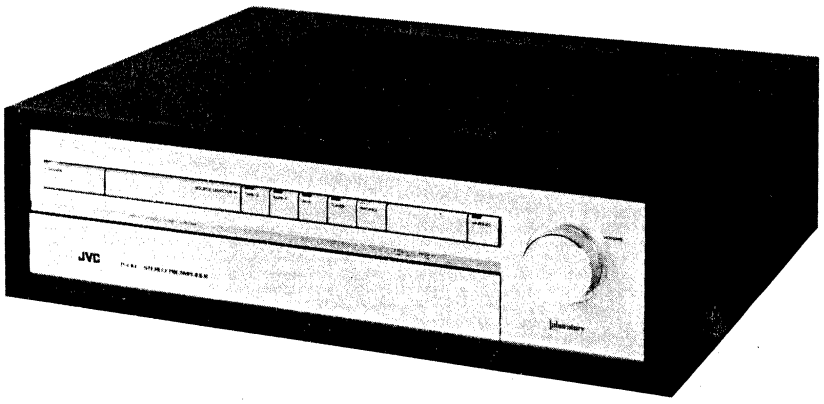
JVC

SERVICE MANUAL

MODEL
P-L10
STEREO PREAMPLIFIER



No. 2619
May. 1982

This manual combines four single volumes.

1. Instruction Manual.
2. Technical Manual.
3. Service Manual.
4. Parts Manual.

P-L10

INSTRUCTION MANUAL

IMPORTANT (In the United Kingdom)
Mains Supply (AC 240 V~, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:

If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt – consult a competent electrician.

Note: We recommend that you should disconnect the AC cord from the outlet when not in use.

WARNING
Dangerous voltage inside

CAUTION
To prevent electric shock, do not remove screws, covers or cabinet.
No user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNUNG
Gefährliche Spannung im Innern

ACHTUNG
Zur Vermeidung von elektrischen Schlägen sollten Schrauben, Abdeckplatten und Gehäuse nicht entfernt werden.
Das Gerät enthält keine von Laien reparierbaren Einzelteile. Reparaturen nur von einem qualifizierten Kundendienst ausführen lassen.

AVERTISSEMENT
Tension dangereuse à l'intérieur

ATTENTION
Afin de prévenir un choc électrique, ne pas enlever les vis, ni les couvercles. Il ne se trouve à l'intérieur aucune pièce pouvant être réparée par l'usager. S'adresser à un réparateur compétent.

Thank you for purchasing this JVC product.
Before you begin operating this unit, please read the instruction book carefully to be sure you get the best possible performance. If you have any question, consult your JVC dealer.

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Vielen Dank für den Kauf dieses JVC-Produkts.
Bitte lesen Sie diese Bedienungsanleitung sorgfältig, bevor Sie dieses Gerät in Betrieb nehmen, um die beste Leistung zu erhalten.
Falls Sie Fragen haben, wenden Sie sich bitte an Ihren JVC-Fachhändler.

INHALT

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Tous nos compliments pour vous être procuré cet appareil de JVC.
Pour que vous puissiez obtenir les meilleures performances possibles nous vous recommandons de lire attentivement le manuel d'instructions avant de commencer à utiliser votre nouvel appareil.
En cas de question, consultez votre revendeur JVC.

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IMPORTANT

■ Safety precautions

1. To prevent fire or electric shock, be careful when handling the power cord.
2. It is dangerous to use this unit if smoke, strange smells, or other unusual symptoms occur.
   In such a case, unplug the power cord and consult your JVC dealer.
3. There are no user serviceable parts inside.
4. Do not place objects containing water on this unit.
5. Do not allow any metallic or inflammable object inside this unit through the ventilation holes, etc.

■ Installation

1. Do not place the unit too close to a heater, and keep it away from direct sunlight, to avoid deformation and discoloration.
2. Avoid humidity, dust and vibration.
3. Avoid quick movement from a cold place to a warm place.
   If a rapid change in temperature occurs, this unit may not function correctly immediately after being moved.
   This is due to moisture condensation on the operating parts. After a short time, it will function normally.
4. Do not hamper ventilation.
   Because ventilation holes are provided on the base to prevent high internal temperatures, do not place the unit in a narrow or poorly ventilated place, nor fill the ventilation holes with tape or cloth.
5. Avoid unstable placement.
   Do not place the unit on an incline, or on a weak table.

■ Precautions for handling

Stacking.

Avoid using the unit in a stack; because if other equipment is put on this unit, a malfunction may occur due to heat trapped by blocked ventilation, or deformation or surface damage to the cabinet may be caused.

■ Maintenance of cabinet

When the cabinet becomes dirty or dusty, etc., wipe with a soft cloth soaked in a liquid wax (silicon wax, etc.) and then wipe evenly with a dry cloth.

Do not use thinner or benzine because cracks or discoloration may occur.

WICHTIG

■ Sicherheitsvorkehrungen

1. Gehen Sie sorgsam mit dem Netzkabel um, um Feuer und elektrische Schläge zu vermeiden.
2. Es ist gefährlich, dieses Gerät zu betreiben, wenn Rauch, seltsame Gerüche und andere ungewöhnliche Symptome auftreten.
   Ziehen Sie in solchen Fällen das Netzkabel aus der Steckdose und wenden sich an Ihren JVC-Fachhändler.
3. Das Gerät enthält keine Teile, die vom Benutzer gewartet werden können.
4. Stellen Sie keine Gefäße mit Wasser auf dieses Gerät.
5. Achten Sie darauf, daß keine metallischen oder entflammbaren Materialien durch die Belüftungsöffnungen usw. in das Gerät eindringen.

■ Aufstellung

1. Stellen Sie das Gerät nicht zu nahe an einer Heizung auf und setzen Sie es nicht direktem Sonnenlicht aus, um Verformungen und Farbänderungen zu vermeiden.
2. Setzen Sie das Gerät nicht Feuchtigkeit, Staub oder Vibrationen aus.
3. Das Gerät sollte nicht rasch von einem kalten Ort zu einem warmen Ort transportiert werden. Nach schnellen Temperaturänderungen funktioniert das Gerät eventuell nicht ordnungsgemäß, weil sich auf den inneren Teilen Feuchtigkeit niedergeschlagen hat. Nach einer kurzen Zeit wird das Gerät wieder normal funktionieren.
4. Hemmen Sie die Belüftung nicht.
   Am Boden des Geräts befinden sich Belüftungsöffnungen, um hohe Temperaturen im Innern zu verhindern. Stellen Sie das Gerät nicht an einem engen oder schlecht belüfteten Ort auf und verschließen Sie die Belüftungsöffnungen nicht mit Klebeband oder Textilien.
5. Vermeiden Sie eine unstabile Aufstellung.
   Stellen Sie das Gerät nicht auf eine geneigte oder unstabile Unterlage.

■ Vorsichtsmaßnahmen beim Betrieb

Stapeln.

Vermeiden Sie eine stapelweise Aufstellung, denn wenn andere Geräte auf dieses Gerät gestellt werden, könnten durch gestaute Hitze wegen blockierter Belüftungsöffnungen Fehlfunktionen auftreten oder Verformungen oder Beschädigungen des Gehäuses verursacht werden.

■ Pflege des Gehäuses

Wenn das Gehäuse schmutzig oder staubig ist, sollte es mit einem weichen Tuch, das in flüssiges Wachs (Silizium-Wachs o.ä.) getaucht wurde, gereinigt werden. Wischen Sie mit einem trockenen Tuch nach.

Verwenden Sie keinen Verdünner und kein Benzin, um Beschädigungen und Verfärbungen zu vermeiden.

IMPORTANT

■ **Précautions à observer**

1. Pour éviter les risques d'incendie ou d'électrocution, manier le fil de branchement avec précaution.
2. L'emploi de cet appareil est dangereux dans le cas d'apparition de fumée, d'odeurs étranges ou d'autres symptômes inhabituels.
   Dans de tels cas, débrancher l'appareil et consulter votre revendeur JVC.
3. Aucune pièce intérieure n'est à régler par l'utilisateur.
4. Ne pas placer d'objet contenant de l'eau sur cet appareil.
5. Ne pas laisser tomber d'objets métalliques ou inflammables à l'intérieur par les trous de ventilation etc.

■ **Installation**

1. Ne pas placer cet appareil trop près d'un radiateur et le tenir à l'écart de la lumière directe du soleil pour éviter sa déformation et sa décoloration.
2. Eviter les endroits humides ou pussiéreux et les vibrations.
3. Eviter les changements brusques de température d'une pièce froide à une pièce chaude. Lors d'un changement brusque de température, cet appareil risque de ne pas bien fonctionner après son déplacement. Ceci est dû à la condensation d'humidité sur les pièces nécessaires au fonctionnement. Il refonctionnera normalement après un court instant.
4. Ne pas obstruer les bouches d'aération.
   Des trous d'aération sont situés sur la base de l'appareil pour éviter des températures internes élevées. Ne pas le placer à un endroit étroit ou mal aéré. Ne pas boucher les trous d'aération avec du ruban adhésif ou du tissu.
5. Eviter de le placer à un endroit instable.
   Ne pas placer l'appareil sur un plan incliné ou sur une table qui n'est pas solide.

■ **Précautions à observer lors de la manipulation**

Empilage.

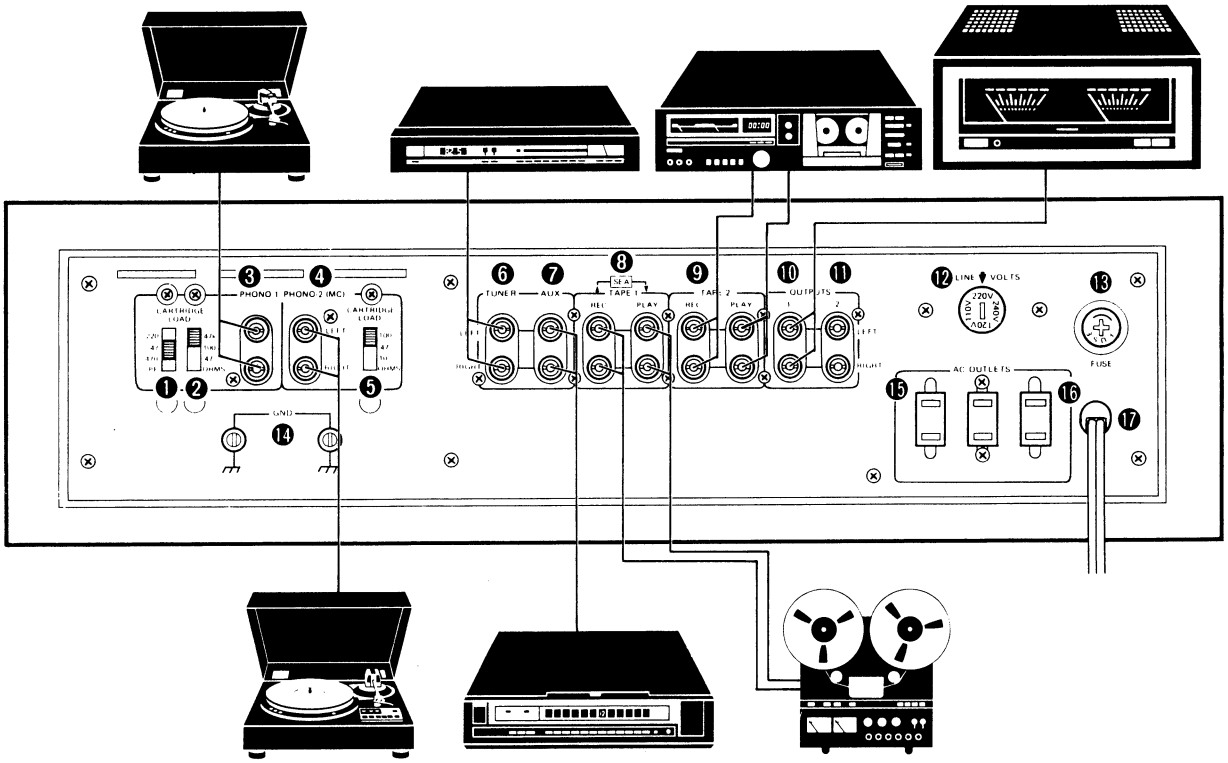
Eviter de superposer cet appareil avec d'autres. Si quelque autre appareil est placé sur celui-ci, il risque de mal fonctionner à cause de l'emmagasinage de chaleur dû au blocage de l'aération, ou bien une déformation ou des dégâts de la surface du coffret risquent de se produire.

■ **Entretien du coffret**

Lorsque le coffret est sale ou poussiéreux etc. l'essuyer avec un chiffon doux imbibé de cire liquide (cire aux silicones etc.) puis le frotter uniformément avec un chiffon sec.

Ne pas utiliser de diluant ni de benzine parce qu'ils risquent de provoquer des craquelures ou une décoloration.

CONNECTION DIAGRAM
ANSCHLUSSDIAGRAMM
SCHEMA DE RACCORDEMENT



❶ **CARTRIDGE LOAD** (220/47/470 PF)
❷ **CARTRIDGE LOAD** (47k/100/47 ohms)
For the position of the CARTRIDGE LOAD selectors, refer to "CARTRIDGE SELECTION" on page 16.
❸ **PHONO-1 terminals**
An MM or high-output MC cartridge can be used in the turntable connected to the PHONO-1 terminals.
❹ **PHONO-2 terminals**
An MC cartridge with an output of 0.05 – 0.1 mV can be used on the turntable connected to the PHONO-2 terminals.
❺ **CARTRIDGE LOAD** (100/47/10 ohms)
For the position of the CARTRIDGE LOAD selectors, refer to "CARTRIDGE SELECTION" on page 16.
❻ **TUNER terminals**
❼ **AUX terminals**
❽ **TAPE-1 terminals**
These terminals can also be used for connecting an S.E.A. graphic equalizer unit. (See page 20.)
❾ **TAPE-2 terminals**
❿ **OUTPUT-1 terminals**
⓫ **OUTPUT-2 terminals**
The P-L10 has two pairs of output terminals for the connection of power amplifiers or other audio equipment. When two power amplifiers are connected, they should be of the same class.
⓬ **AC LINE VOLTAGE SELECTOR**
For details, see page 24.
⓭ **AC fuse socket**
⓮ **GND terminals**
If your turntable has separate ground lead, connect it to the corresponding GND terminal.
⓯ **SWITCHED AC outlets***
The SWITCHED AC outlets are switched off when the front panel power switch is switched off.
⓰ **UNSWITCHED AC outlet***
The UNSWITCHED AC outlet is not switched off when the front panel power switch is switched off.

Note*:
- **The AC OUTLETS are exclusively for the connection of audio equipment; never connect a power amplifier requiring more than the rated output, a power amplifier with an output of more than 100 W + 100 W without a surge-prevention circuit or equipment which generates noise such as a fluorescent lamp.**

⓱ **Power cord**

NOTES
1. **When the POWER switch is pressed to switch the power on, no sound will be heard for 5 – 7 seconds; this is to protect against switching noise. When other switches and controls are operated, noise may be heard; this is not a malfunction. Before operating, wait till conditions are stabilized.**
2. **Connect source components with left and right channels connected correctly. Reversed channels will degrade the stereo effect.**
3. **Switch the power off when connecting any component.**
4. **Connect plugs or wires firmly. Poor contact may result in hum.**

❶ **Tonabnehmer-Lastwiderstand (CARTRIDGE LOAD)**
(220/47/470 PF)

❷ **Tonabnehmer-Lastwiderstand (CARTRIDGE LOAD)**
(47k/100/47 Ohm)
Beziehen Sie sich für die Einstellung der CARTRIDGE LOAD-Wahlschalter auf Seite 18.

❸ **Plattenspieler-1-Buchsen (PHONO-1)**
An die PHONO-1-Buchsen kann ein Plattenspieler mit einem magnetischen Tonabnehmer (MM) oder einem dynamischen Tonabnehmer (MC) mit hohem Ausgang angeschlossen werden.

❹ **Plattenspieler-2-Buchsen (PHONO-2)**
An die PHONO-2-Buchsen kann ein Plattenspieler mit einem dynamischen Tonabnehmer mit einem Ausgang von 0,05 bis 0,1 mV angeschlossen werden.

❺ **Tonabnehmer-Lastwiderstand (CARTRIDGE LOAD)**
(100/47/10 Ohm)
Beziehen Sie sich für die Einstellung der CARTRIDGE LOAD-Wahlschalter auf Seite 18.

❻ **Tuner-Buchsen (TUNER)**

❼ **Aux-Buchsen (AUX)**

❽ **Tonband-1-Buchsen (TAPE-1)**
Diese Buchsen können auch für den Anschluß eines S.E.A.-Mehrbereichklangreglers verwendet werden. (Siehe Seite 20.)

❾ **Tonband-2-Buchsen (TAPE-2)**

❿ **Ausgang-1-Buchsen (OUTPUT-1)**

⓫ **Ausgang-2-Buchsen (OUTPUT-2)**
Der P-L10 ist mit zwei Paaren von Ausgangsbuchsen zum Anschluß an Leistungsverstärker oder andere Audiogeräte ausgestattet. Wenn zwei Leistungsverstärker angeschlossen werden, sollten diese von derselben Klasse sein.

⓬ **Spannungswähler (AC LINE VOLTAGE SELECTOR)**
Beziehen Sie sich für Einzelheiten auf Seite 24.

⓭ **Netzsicherungshalter (AC)**

⓮ **Erdungsbuchsen (GND)**
Wenn Ihr Plattenspieler mit einer separaten Erdungsleitung versehen ist, schließen Sie sie an die entsprechende GND-Buchse an.

⓯ **Beschaltete Netzausgänge (SWITCHED AC)***
Die beschalteten Netzausgänge sind abgeschaltet, wenn der Netzschalter an der Frontplatte ausgeschaltet ist.

⓰ **Unbeschalteter Netzausgang (UNSWITCHED AC)***
Der unbeschaltete Netzausgang ist nicht abgeschaltet, wenn der Netzschalter an der Frontplatte ausgeschaltet ist.

*Hinweis:

- **An die Netzausgänge sollten ausschließlich Audio-Geräte angeschlossen werden. Schließen Sie niemals einen Leistungsverstärker an, dessen Leistungsaufnahme höher als der Nennausgang ist, dessen Ausgangsleistung höher als 100 W + 100 W ist und der nicht mit einer Schutzschaltung gegen plötzliche starke Impulse ausgestattet ist. Weiterhin sollten auch keine Geräte angeschlossen werden, die Störgeräusche wie von Fluoreszenzlampen generieren.**

⓱ **Netzkabel**

HINWEISE

1. **Wenn der Netzschalter (POWER) zum Einschalten der Spannungsversorgung gedrückt wird, ist während der ersten 5 bis 7 Sekunden kein Ton hörbar, um das Gerät vor Schaltknacksen zu schützen. Wenn andere Schalter und Regler bedient werden, können Geräusche auftreten, dies ist jedoch keine Fehlfunktion. Warten Sie, bis sich die Funktionen stabilisiert haben, bevor Sie das Gerät in Betrieb nehmen.**
2. **Verbinden Sie die Tonquellen-Komponenten mit den linken und rechten Kanälen richtig angeschlossen. Verkehrt angeschlossene Kanäle vermindern den Stereo-Effekt.**
3. **Schalten Sie die Betriebsspannung aus, wenn Sie andere Geräte anschließen.**
4. **Schließen Sie Stecker und Kabel fest an. Wackelkontakte können Brummgeräusche zur Folge haben.**

❶ **CARTRIDGE LOAD** (220/47/470 PF)

❷ **CARTRIDGE LOAD** (47k/100/47 ohms)
Pour le réglage des sélecteurs de charge de cellule (CARTRIDGE LOAD), reportez-vous à "SELECTION DE CELLULE", page 16.

❸ **Bornes PHONO-1**
On peut utiliser une cellule à aimant mobile ou une cellule à bobine mobile à haut niveau de sortie sur la platine branchée aux bornes PHONO-1.

❹ **Bornes PHONO-2**
On peut utiliser une cellule à bobine mobile avec un niveau de sortie de 0,05 à 0,1 mV sur la platine branchée aux bornes PHONO-2.

❺ **CARTRIDGE LOAD** (100/47/10 ohms)
Pour le réglage des sélecteurs de charge de cellule (CARTRIDGE LOAD), reportez-vous à "SELECTION DE CELLULE", page 16.

❻ **Bornes TAPE-2**

❼ **Bornes AUX**

❽ **Bornes TAPE-1**
Ces bornes peuvent également être utilisées pour le raccordement d'un égaliseur graphique S.E.A. (Voir page 20.)

❾ **Borne TAPE-2**

❿ **Bornes OUTPUT-1**

⓫ **Bornes OUTPUT-2**
Le P-L10 dispose de deux paires de bornes de sortie pour amplificateurs de puissance ou tout autre matériel audio. Si l'on raccorde deux amplificateurs, ils doivent être de la même classe.

⓬ **Sélecteur de tension CA (AC LINE VOLTAGE SELECTOR)**
Pour les détails, voir page 24.

⓭ **Porte-fusible**

⓮ **Bornes de prise de terre (GND)**
Si votre platine tourne-disque est munie d'un cordon de prise de terre séparé, branchez-le à la borne de prise de terre (GND) correspondante.

⓯ **Arrivées secteur commutées (SWITCHED AC)***
Les arrivées commutées (SWITCHED AC) sont débranchées lorsque l'interrupteur d'alimentation du panneau avant est en position hors-circuit.

⓰ **Arrivée secteur non commutée (UNSWITCHED AC)***
L'arrivée non commutée (UNSWITCHED AC) ne se débranche pas, même lorsque l'interrupteur d'alimentation du panneau avant est en position hors-circuit.

Remarque*:

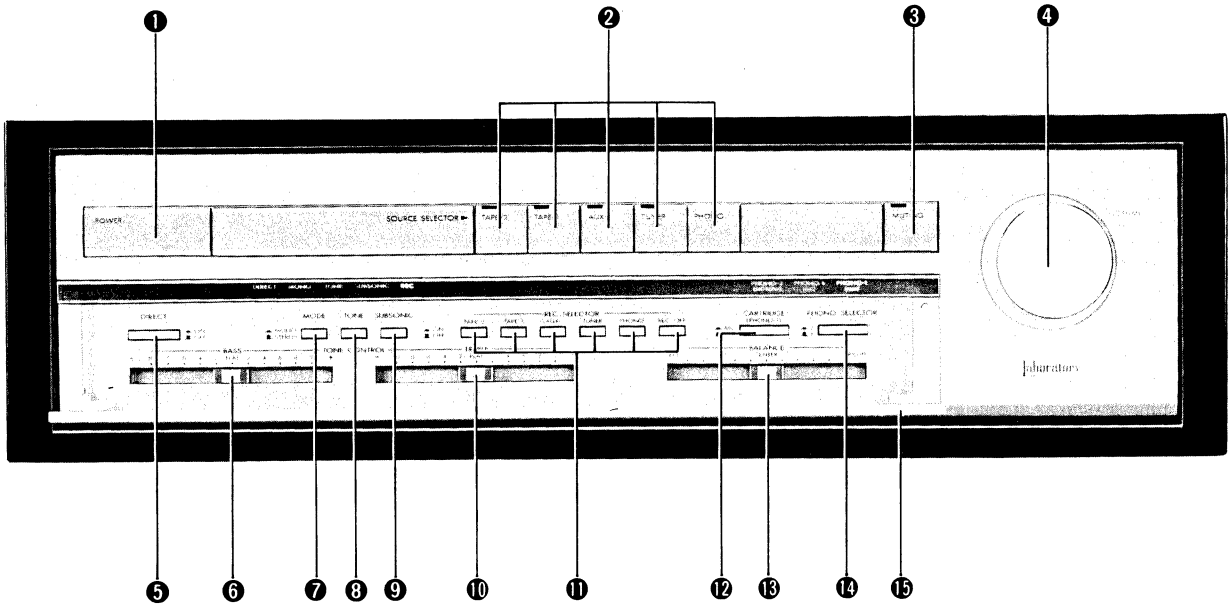
- **Les arrivées secteur (AC OUTLETS) sont réservées au branchement de matériel audio. N'y branchez jamais un amplificateur de puissance exigeant plus que leur sortie nominale, un amplificateur de puissance délivrant plus de 100 W + 100 W dépourvu de circuit de protection contre les surintensités ou un appareil faisant des parasites tel que les lampes fluorescentes.**

⓱ **Cordon d'alimentation**

REMARQUE

1. **Lorsqu'on appuie sur la touche de mise en route (POWER), on n'entend aucun son pendant 5 à 7 secondes, afin d'éviter tout bruit de commutation. Avec d'autres commutateurs, il se peut qu'on entende un bruit; il ne s'agit pas d'un défaut de l'appareil. Avant l'utilisation, attendez que les conditions se soient stabilisées.**
2. **Raccordez les appareils de source sonore avec les canaux gauche et droit correctement placés. Une inversion de canaux dégrade l'effet stéréophonique.**
3. **Coupez l'alimentation à chaque fois qu'un appareil extérieur est raccordé.**
4. **Raccordez fermement les fiches et les fils. Un mauvais contact peut être à l'origine de ronflement.**

FRONT PANEL
FRONTPLATTE
PANNEAU AVANT



Attention (for the controls behind the flip-down door)
Each pushbutton switch has two positions to which it can be set: the "in" position and the "out" position.
▬ : Indication for the "in" (engaged) position. The switch can be set to this position by simply pressing it.
▙ : Indication for the "out" (released) position. If the switch is already in the "in" position, simply pressing it again will set it to the "out" position.

❶ **POWER switch**
Press to turn the power on: the indicator will flicker for 5 – 7 seconds showing that the muting circuit is functioning. When the operating condition is stabilized, the indicator will light continuously. While the indicator is flickering, no sound is output.

❷ **SOURCE SELECTOR**
(TAPE-2, TAPE-1, AUX, TUNER, PHONO)
TAPE-2 : Press to listen to the tape deck connected to the TAPE-2 terminals.
TAPE-1 : Press to listen to the tape deck connected to the TAPE-1 terminals.
AUX : Press to listen to the program source connected to the AUX terminals.
TUNER : Press to listen to a broadcast received by the tuner connected to the TUNER terminals.
PHONO : Press to listen to a record played on the turntable connected to the PHONO terminals.

Note:
- **When any of these buttons is pressed, the indicator in the button lights.**

❸ **MUTING switch**
Press to lower the sound volume instantaneously. The indicator will light and the volume will be cut by 20 dB (i.e. to 1/10th of its previous volume).
To release muting, press again.

❹ **VOLUME control**
Use to adjust the volume of the output sound from the speakers or headphones.

Note:
- **The volume should be adjusted for different types of music and occasions. Especially late at night, music sounds good even at low volumes which will not disturb your neighbors.**

❺ **DIRECT switch**
ON (▬) : Press to defeat the control circuits for a flat frequency response. The DIRECT indicator will light and the MODE, TONE and SUBSONIC indicators will go out.
OFF (▙) : Press again to activate the MODE, TONE (BASS, TREBLE) and SUBSONIC functions.

❻ **BASS control**
Use to adjust low frequency response. In its center position, low frequency response is flat (standard). To boost low frequencies, slide to the right (⟶); to attenuate low frequencies, slide to the left (⟵).

❼ **MODE switch**
MONO (▬) : When set to this position, the left and right channels are mixed and heard from both speakers. The MONO indicator lights.
STEREO (▙) : Normally set to this position for stereo sound.

❽ **TONE switch**
ON (▬) : Set to this position to adjust the tone with the BASS and TREBLE controls. The TONE indicator lights.
OFF (▙) : Set to this position for flat frequency response.

❾ **SUBSONIC switch**

ON (▂): If you can hear ultra-low frequency distortion due to a warped record or speaker intermodulation distortion, set to this position. The SUBSONIC indicator will light.

OFF (▁): Normally set to this position.

❿ **TREBLE control**

Use to adjust high frequency response. In its center position, high frequency response is flat (standard). To boost high frequencies, slide to the right (⟶); to attenuate high frequencies, slide to the left (⟵).

⓫ **REC SELECTOR**

Press the button corresponding to the program source to be recorded. When any button other than the REC OFF button is pressed, the REC indicator will light.

TAPE-2: Press to dub from the tape deck connected to the TAPE-2 terminals to the tape deck connected to the TAPE-1 terminals.

TAPE-1: Press to dub from the tape deck connected to the TAPE-1 terminals to the tape deck connected to the TAPE-2 terminals.

AUX: Press to record from the source connected to the AUX terminals.

TUNER: Press to record the signal from the tuner connected to the TUNER terminals.

PHONO: Press to record the signal from the turntable connected to the PHONO terminals.

REC OFF: Press when not recording. The REC indicator goes out and no signals are output from the TAPE-1 and TAPE-2 terminals.

⓬ **CARTRIDGE switch**

MC (▂): Set to this position when an MC cartridge is used on the turntable connected to the PHONO -1 terminals. The PHONO-1 MC indicator will light.

MM (▁): Set to this position when an MM cartridge is used on the turntable connected to the PHONO -1 terminals. The PHONO-1 MM indicator will light.

⓭ **BALANCE control**

Use to balance the sound from the left and right speakers. Normally set to the center position. Slide it to the right when there is too much left speaker sound and to the left when there is too much right speaker sound.

Note:

- **This preamplifier was designed for quality sound. One feature is that, when the MODE switch is set to MONO, it is impossible to balance the left and right channels with the BALANCE control. If the BALANCE control is slid fully to the left or right, the left or right channel signal will be heard from both speakers with the same volume.**

⓮ **PHONO SELECTOR**

2 (▂): Press to listen to a record being played on the turntable connected to the PHONO-2 terminals. The PHONO-2 indicator will light.

1 (▁): Press to listen to a record being played on the turntable connected to the PHONO-1 terminals. The PHONO-1 MC or PHONO-1 MM indicator will light depending on the cartridge being used.

⓯ **Flip-down door**

To open the flip-down door, press the button to its right; this half-opens it, open the rest of the way by hand. If the door is too loose or too tight, adjust with the screwdriver provided as shown in the diagram. If you have difficulty, consult your JVC dealer.

Hinweis (für die Bedienelemente hinter der Klappe)
Jeder Druckknopf-Schalter kann auf zwei Einstellungen gestellt werden: auf die "Ein"- und "Aus"-Stellung.

▂ : Kennzeichen für die "Ein"-Stellung (eingeschaltet). Der Schalter kann durch Drücken in diese Stellung gebracht werden.

▁ : Kennzeichen für die "Aus"-Stellung (freigegeben). Wenn sich der Schalter schon in der "Ein"-Stellung befindet, kann er durch nochmaliges Drücken in die "Aus"-Stellung gebracht werden.

❶ **Netzschalter (POWER)**

Drücken Sie diesen Schalter zum Einschalten der Spannungsversorgung: die Anzeige flackert 5 bis 7 Sekunden und zeigt damit an, daß die Dämpfungsschaltung arbeitet. Wenn der Betrieb sich stabilisiert hat, leuchtet die Anzeige kontinuierlich. Solange die Anzeige flackert, ist kein Ton hörbar.

❷ **Quellenwähler (SOURCE SELECTOR)**
(TAPE-2, TAPE-1, AUX, TUNER, PHONO)

TAPE-2: Zum Hören des Tonbanddecks, das an den TAPE-2-Buchsen angeschlossen ist, drücken.

TAPE-1: Zum Hören des Tonbanddecks, das an den TAPE-1-Buchsen angeschlossen ist, drücken.

AUX: Zum Hören der Quelle, die an den AUX-Buchsen angeschlossen ist, drücken.

TUNER: Zum Hören des Tuners, der an den TUNER-Buchsen angeschlossen ist, drücken.

PHONO: Zum Hören des Plattenspielers, der an den PHONO-Buchsen angeschlossen ist, drücken.

Hinweise:

- **Wenn eine dieser Tasten gedrückt ist, leuchtet die Anzeige in der Taste.**

❸ **Stummschalter (MUTING)**

Drücken Sie diesen Schalter, um die Lautstärke unmittelbar zu verringern. Die Anzeige leuchtet, und die Lautstärke ist um 20 dB gedämpft (d.h. auf ein Zehntel der vorigen Lautstärke).
Durch nochmaliges Drücken wird die ursprüngliche Lautstärke wieder eingestellt.

❹ **Lautstärkeregler (VOLUME)**

Zum Einstellen der Lautstärke der Lautsprecher oder des Kopfhörers.

Hinweis:

- **Die Lautstärke sollte entsprechend der Musikart und den Hörbedingungen eingestellt werden. Vor allem spät am Abend hört sich Musik bei niedrigen Lautstärken gut an und stört die Nachbarn nicht.**

❺ **Direktschalter (DIRECT)**

ON (▂): Zum Umgehen der Steuerschaltungen drücken, um einen flachen Frequenzverlauf zu erhalten. Die DIRECT-Anzeige leuchtet, die MODE-, TONE- und SUBSONIC-Anzeigen gehen aus.

OFF (▁): Durch nochmaliges Drücken werden die MODE-, TONE- (BASS, TREBLE) und SUBSONIC-Funktionen wieder aktiviert.

❻ **Baßregler (BASS)**

Zum Einstellen der niedrigen Frequenzen. In der Mittelstellung ist der Verlauf der niedrigen Frequenzen flach (Standard). Zum Anheben der tiefen Frequenzen wird der Regler nach rechts (⟶) und zum Dämpfen der tiefen Frequenzen nach links (⟵) geschoben.

❼ **Betriebsartschalter**

MONO (▬): Bei dieser Schalterstellung werden der linke und der rechte Kanal gemischt über beide Lautsprecher gehört. Die MONO-Anzeige leuchtet.

STEREO (▬): Normalerweise sollte der Schalter für Stereowiedergabe in dieser Stellung stehen.

❽ **Klangschalter (TONE)**

ON (▬): Schalten Sie auf diese Position, um den Klang mit den BASS- und TREBLE-Reglern einzustellen. Die TONE-Anzeige leuchtet.

OFF (▬): Schalten Sie auf diese Position, um einen flachen Frequenzverlauf zu erhalten.

❾ **Unterschallschalter (SUBSONIC)**

ON (▬): Schalten Sie auf diese Position, wenn ultratiefe Frequenzverzerrungen wegen einer abgenutzten Schallplatte oder wegen Intermodulationsverzerrungen der Lautsprecher auftreten. Die SUBSONIC-Anzeige leuchtet.

OFF (▬): Normalerweise sollte der Schalter auf dieser Position stehen.

❿ **Höhenregler (TREBLE)**

Zum Einstellen der hohen Frequenzen. In der Mittelstellung ist der Verlauf der hohen Frequenzen flach (Standard). Zum Anheben der hohen Frequenzen wird der Regler nach rechts (⟶) und zum Dämpfen der hohen Frequenzen nach links (⟵) geschoben.

⓫ **Aufnahmewahl-Tasten (REC SELECTOR)**

Drücken Sie eine Taste entsprechend der Quelle, die Sie aufnehmen wollen. Wenn eine Taste außer der REC OFF-Taste gedrückt ist, leuchtet die REC-Anzeige.

TAPE-2: Drücken Sie diese Taste zum Überspielen von einem Tonbanddeck, das an den TAPE-2-Buchsen angeschlossen ist, auf ein Tonbanddeck, das an den TAPE-1-Buchsen angeschlossen ist.

TAPE-1: Drücken Sie diese Taste zum Überspielen von einem Tonbanddeck, das an den TAPE-1-Buchsen angeschlossen ist, auf ein Tonbanddeck, das an den TAPE-2-Buchsen angeschlossen ist.

AUX: Zum Aufnehmen der Quelle, die an den AUX-Buchsen angeschlossen ist, drücken.

TUNER: Zum Aufnehmen des Tuners, der an den TUNER-Buchsen angeschlossen ist, drücken.

PHONO: Zum Aufnehmen des Plattenspielers, der an den PHONO-Buchsen angeschlossen ist, drücken.

REC OFF: Dieser Schalter sollte gedrückt sein, wenn nicht aufgenommen wird. Die REC-Anzeige geht aus, und an den TAPE-1- und TAPE-2-Buchsen werden keine Signale ausgegeben.

⓬ **Tonabnehmerschalter (CARTRIDGE)**

MC (▬): Schalten Sie auf diese Position, wenn der Plattenspieler, der an den PHONO-1-Buchsen angeschlossen ist, mit einem dynamischen Tonabnehmer (Schwingspule) ausgerüstet ist. Die PHONO-1 MC-Anzeige leuchtet.

MM (▬): Schalten Sie auf diese Position, wenn der Plattenspieler, der an den PHONO-1-Buchsen angeschlossen ist, mit einem magnetischen Tonabnehmer ausgerüstet ist. Die PHONO-1 MM-Anzeige leuchtet.

⓭ **Balanceregler (BALANCE)**

Zum Einstellen der Balance zwischen dem rechten und linken Lautsprecher. Normalerweise sollte der Regler in der Mittelposition stehen. Schieben Sie den Regler nach rechts, wenn der linke Lautsprecher zu laut ist, und nach links, wenn der rechte Lautsprecher zu laut ist.

Hinweis:

- **Dieser Vorverstärker wurde für Qualitätsklang entworfen. Ein Merkmal ist, daß, wenn der MODE-Schalter auf MONO steht, es nicht möglich ist, die Balance zwischen den beiden Kanälen mit dem BALANCE-Regler durchzuführen. Auch wenn der BALANCE-Regler ganz nach links oder ganz nach rechts geschoben wird, bleibt die Lautstärke beider Lautsprecher gleich.**

⓮ **Plattenspielerwähler (PHONO SELECTOR)**

2 (▬): Zum Hören des Plattenspielers, der an den PHONO-2-Buchsen angeschlossen ist, drücken. Die PHONO-2-Anzeige leuchtet.

1 (▬): Zum Hören des Plattenspielers, der an den PHONO-1-Buchsen angeschlossen ist, drücken. Entsprechend des benutzten Tonabnehmers leuchtet die PHONO-1 MC- oder die PHONO-1 MM-Anzeige.

⓯ **Herunterklappbare Verkleidung**

Drücken Sie zum Öffnen der herunterklappbaren Verkleidung den Knopf an der rechten Seite der Verkleidung, dadurch wird die Verkleidung halb geöffnet, öffnen Sie sie danach ganz mit der Hand. Wenn die Verkleidung zu lose oder zu fest ist, kann sie mit dem mitgelieferten Schraubenzieher justiert werden, siehe Abbildung. Wenden Sie sich an Ihren JVC-Fachhändler, wenn Sie dabei Schwierigkeiten haben.

Attention (pour les commandes situées derrière le volet basculant)

Chaque bouton-poussoir possède deux positions sur lesquelles il peut être placé: la position "enfoncée" et la position "sortie".

▬ : Indication pour la position "enfoncée" (enclenchée). Le commutateur peut être placé sur cette position en l'enfonçant simplement.

▬ : Indication pour la position "sortie" (relâchée). Si le commutateur est déjà dans la position "enfoncée", il suffit simplement de l'enfoncer une fois de plus pour le placer sur la position "sortie".

❶ **Interrupteur d'alimentation (POWER)**

Appuyez pour la mise en route: le témoin clignote pendant 5 à 7 secondes pour indiquer que le circuit silencieux fonctionne. Lorsque les conditions de fonctionnement se sont stabilisées, l'indicateur reste allumé en continu. Tant qu'il clignote, aucun son ne sort.

❷ **Sélecteur de SOURCE (TAPE-2, TAPE-1, AUX, TUNER, PHONO)**

TAPE-2 : A enfoncer pour écouter la platine magnétophone branchée aux bornes TAPE-2.

TAPE-1 : A enfoncer pour écouter la platine magnétophone branchée aux bornes TAPE-1.

AUX : A enfoncer pour écouter la source branchée aux bornes AUX.

TUNER : A enfoncer pour écouter les émissions captées par le tuner branché aux bornes TUNER.

PHONO : A enfoncer pour écouter un disque lu par la platine branchée aux bornes PHONO.

Remarque:

- **Lorsque l'une de ces touches est enfoncée, son témoin lumineux s'allume.**

❸ **Commutateur de sourdine (MUTING)**
En appuyant, on abaisse instantanément le volume sonore. Le témoin s'allume et le volume est réduit de 20 dB (c'est-à-dire à 1/10 de son volume précédent).
Pour faire cesser la sourdine, réappuyer sur la touche.

❹ **Commande de VOLUME**
Sert à régler le volume de sortie sonore des enceintes ou du casque.

Remarque:
- **Le volume doit être réglé selon le type de musique et les circonstances. En particulier, tard le soir, la musique rend bien même à faible volume sans déranger vos voisins.**

❺ **Commutateur DIRECT**
ON (▬) : Appuyer pour annuler les circuits de commande et obtenir une réponse linéaire. Le témoin DIRECT s'allume, tandis que les témoins MODE, TONE et SUBSONIC s'éteignent.
OFF (▟) : Réappuyer pour mettre en service les fonctions MODE, TONE (BASS, TREBLE) et SUBSONIC.

❻ **Commandes des graves (BASS)**
Sert à régler la réponse dans les basses fréquences. En position centrale, la restitution des graves est linéaire (normale). Pour accentuer les graves, faites glisser la commande vers la droite (⟶); pour les atténuer, faites-la glisser vers la gauche (⟵).

❼ **Commutateur de MODE**
MONO (▬) : Dans cette position, les canaux gauche et droit sont mélangés et entendus par les deux enceintes. Le témoin MONO s'allume.
STEREO (▟) : Position normale pour le rendu stéréo.

❽ **Commutateur de tonalité (TONE)**
ON (▬) : Dans cette position on peut régler la tonalité avec les commandes de graves et d'aigus (BASS, TREBLE). Le témoin TONE s'allume.
OFF (▟) : Dans cette position, on obtient une réponse linéaire.

❾ **Commutateur subsonique (SUBSONIC)**
ON (▬) : Si vous percevez des distorsions dans les fréquences ultra-graves causées par des disques voilés ou des distorsions d'intermodulation des haut-parleurs, choisissez cette position. Le témoin SUBSONIC s'allume.
OFF (▟) : Position normale.

❿ **Commande des aigus (TREBLE)**
Sert à régelr la réponse dans les hautes fréquences. En position centrale, la restitution des aigus est linéaire (normale). Pour accentuer les aigus, faites glisser la commande vers la droit (⟶); pour les atténuer, faites-la glisser vers la gauche (⟵).

⓫ **Sélecteur d'enregistrement (REC SELECTOR)**
Appuyer sur la touche correspondant à la source que vous désirez enregistrer. Lorsqu'une touche autre que REC OFF est enfoncée, le témoin d'enregistrement (REC) s'allume.
TAPE-2 : A enfoncer pour faire la copie du magnétophone branché aux bornes TAPE-2 sur celui branché aux bornes TAPE-1.
TAPE-1 : A enfoncer pour faire la copie du magnétophone branché aux bornes TAPE-1 sur celui branché aux bornes TAPE-2.
AUX : A enfoncer pour enregistrer la source branchée aux bornes AUX.
TUNER : A enfoncer pour enregistrer le signal du tuner branché aux bornes TUNER.
PHONO : A enfoncer pour enregistrer le signal de la platine branchée aux bornes PHONO.
REC OFF : A enfoncer lorsqu'on n'enregistre pas. Le témoin REC s'éteint et aucun signal ne sort par les prises TAPE-1 et TAPE-2.

⓬ **Commutateur de cellule (CARTRIDGE)**
MC (▬) : Position correspondant à l'emploi d'une cellule à bobine mobile sur la platine branchée à la prise PHONO-1. Le témoin PHONO-1 MC s'allume.
MM (▟) : Position correspondant à l'emploi d'une cellule à aimant mobile sur la platine branchée à la prise PHONO-1. Le témoin PHONO-1 MM s'allume.

⓭ **Commande de BALANCE**
Sert à équilibrer le son entre les enceintes gauche et droite. A laisser normalement en position centrale. Pousser la glissière vers la droite quand le volume est trop élevé à gauche et vers la gauche dans le cas contraire.

Remarque:
- **Ce préamplificateur a été conçu pour une restitution de qualité. Une de ses caractéristique est que, lorsque la touche MODE est sur MONO, il est impossible de répartir les canaux gauche et droit avec la BALANCE. Si l'on pousse la BALANCE à fond vers la gauche ou la droite, on entendra le signal gauche ou droit par les deux enceintes au même niveau.**

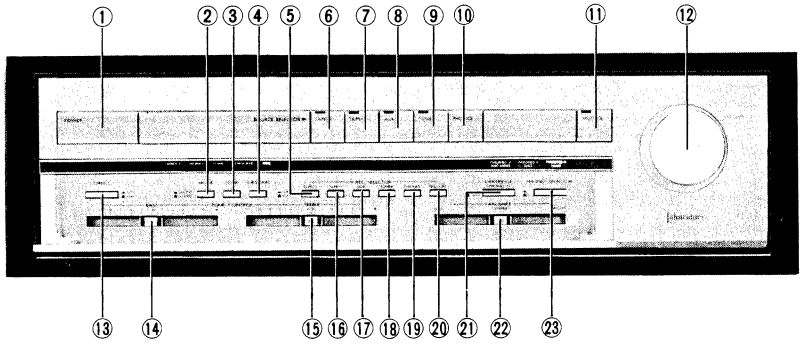
⓮ **Sélecteur PHONO**
2 (▬) : Enfoncer la touche pour écouter un disque lu par la platine branchée à la prise PHONO-2. Le témoin PHONO-2 s'allume.
1 (▟) : Réappuyer sur la touche pour écouter un disque lu par la platine branchée à la prise PHONO-1. Le témoin PHONO-1 MC ou PHONO-1 MM s'allumera selon la cellule employée.

⓯ **Porte basculante**
Pour ouvrir la porte basculante, appuyez sur la touche à droite; elle s'ouvre alors à moitié; on l'ouvre complètement avec la main. S'il y a trop ou pas assez de jeu, servez-vous du tournevis fourni, en suivant le schéma. Si vous avez des difficultés, consultez votre revendeur JVC.

OPERATION

Set the switches as you like and switch on the POWER switch ①.
To prevent loud noise, turn the VOLUME control ⑫ all the way to the left and adjust it.
For the controls not mentioned here, refer to "FRONT PANEL" on page 6.

SOURCE SELECTION	SOURCE SELECTOR ⑥ ~ ⑩	PHONO SELECTOR ㉓	CARTRIDGE ㉑
Records → Connect the turntable to the correct terminals. → •PHONO-1 * When using a 0.1 – 5 mV output MC or 1 – 10 mV output MM cartridge.	Press the PHONO switch ⑩. Note: Set the CARTRIDGE switch ㉑ and the CARTRIDGE LOAD selectors on the rear panel while refering to "CARTRIDGE SELECTION" on page 16.	Set to "1".	Set to "MC" when using 0.1 – 1 mV output MC cartridge and set to "MM" when using the 1 – 10 mV output MM or the 1 – 5 mV output MC cartridge.
Records → Connect the turntable to the correct terminals. → •PHONO-2 * When using a 0.05 – 0.1 mV output MC cartridge.		Set to "2".	———
FM or AM broadcasts	Press the TUNER switch ⑨.	———	———
When listening to a source connected to the AUX terminals.	Press the AUX switch ⑧.	———	———
Tape → Connect the tape deck → •TAPE-1	Press the TAPE-1 switch⑦.	———	———
Tape → Connect the tape deck → •TAPE-2	Press the TAPE-2 switch⑥.	———	———

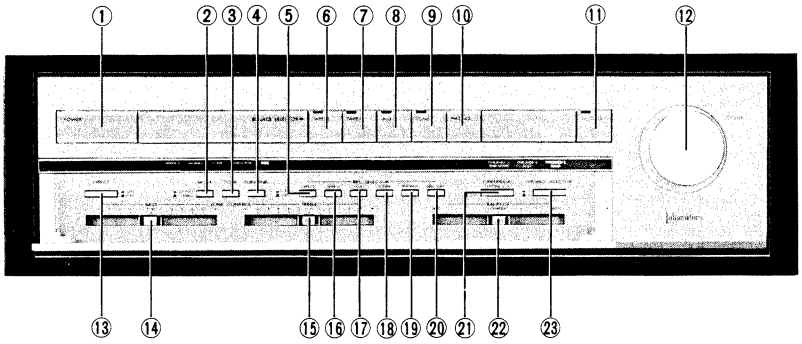


	REC SELECTOR ⑤, ⑯ ~ ⑳	TAPE deck		Note
		TAPE-1	TAPE-2	
Recording selections	Press the PHONO switch ⑲.	Either tape deck can be used for recording.		• Because the REC SELECTOR and the SOURCE SELECTOR are connected in parallel, they function independently. Therefore, it is possible to record a broadcast or to dub a tape while listening to a record. • To monitor a recording made with a three-head tape deck, press the TAPE-1 switch ⑦ for the TAPE-1 tape deck or the TAPE-2 switch ⑥ for the TAPE-2 tape deck. • Adjust the tape deck's volume control for the recording level.
	Press the TUNER switch ⑱.			
	Press the AUX switch ⑰.			
When dubbing from TAPE-1 to TAPE-2.	Press the TAPE-1 switch ⑯.	Playback	Recording	
When dubbing from TAPE-2 to TAPE-1.	Press the TAPE-2 switch ⑤.	Recording	Playback	

BEDIENUNG

Drücken Sie den Netzschalter (POWER) ①, die übrigen Schalter können sich dabei in jeder Stellung befinden.
Schieben Sie zum Vermeiden von lauten Geräuschen den Lautstärkeregler (VOLUME) ⑫ ganz nach links und stellen Sie dann die Lautstärke ein. Beziehen Sie sich für die Bedienelemente, die hier nicht erwähnt werden, auf den Abschnitt "FRONTPLATTE" auf Seite 6.

QUELLENWAHL	SOURCE SELECTOR ⑥ ~ ⑩	PHONO SELECTOR ㉓	CARTRIDGE ㉑
Schallplatten → Schließen Sie den Plattenspieler an die richtigen Buchsen an. → •PHONO-1 * Für einen dynamischen Tonabnehmer mit 0,1 – 5 mV Ausgang oder einen magnetischen Tonabnehmer mit 1 – 10 mV Ausgang.	Den PHONO-Schalter ⑩ drücken. Hinweis: Beziehen Sie sich für die Einstellung des CARTRIDGE-Schalters ㉑ und der CARTRIDGE LOAD-Wähler an der Rückplatte auf den Abschnitt "TONABNEHMERWAHL" auf de Seite 16.	Auf "1" stellen.	Für einen dynamischen T… abnehmer mit 0,1 – … Ausgang auf "MC" und f… einen dynamischen Tona… nehmer mit 1 – 5 mV Au… gang oder einen magnetisch… Tonabnehmer mit 1 – 10 m… Ausgang auf "MM" stelle…
→ •PHONO-2 * Für einen dynamischen Tonabnehmer mit 0,05 – 0,1 mV Ausgang.		Auf "2" stellen.	———
UKW- oder MW-Sendungen	Den TUNER-Schalter ⑨ drücken.	———	———
Zum Hören einer Quelle, die an den AUX-Buchsen angeschlossen ist.	Den AUX-Schalter ⑧ drükken.	———	———
Tonband → Das Tonbanddeck anschließen. → •TAPE-1	Den TAPE-1-Schalter ⑦ drücken.	———	———
•TAPE-2	Den TAPE-2-Schalter ⑥ drücken.	———	———

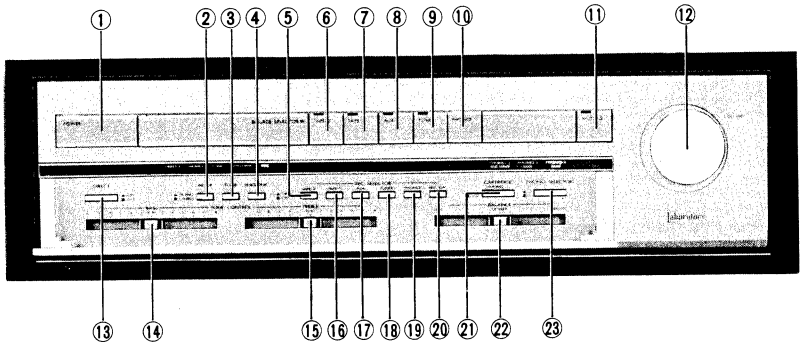


	REC SELECTOR ⑤, ⑯ ~ ⑳	Tonbanddeck		Hinweise
		TAPE-1	TAPE-2	
Aufnahmewahl	Den PHONO-Schalter ⑲ drücken.	Jedes Deck kann für die Aufnahme benutzt werden.		• Weil der REC SELECTOR und der SOURCE SELECTOR parallelgeschaltet sind, funktionieren sie unabhängig. Daher ist es möglich, gleichzeitig eine Rundfunksendung aufzunehmen oder ein Band zu kopieren und eine Schallplatte zu hören. • Um bei einer Aufnahme mit einem Tonbanddeck mit drei Tonköpfen mitzuhören, wird für das TAPE-1-Deck der TAPE-1-Schalter ⑦ und für das TAPE-2-Deck der TAPE-2-Schalter ⑥ gedrückt. • Stellen Sie den Aufnahmepegel mit den Reglern des Tonbanddecks ein.
	Den TUNER-Schalter ⑱ drücken.			
	Den AUX-Schalter ⑰ drücken.			
Zum Überspielen von TAPE-1 nach TAPE-2.	Den TAPE-1-Schalter ⑯ drücken.	Wiedergabe	Aufnahme	
Zum Überspielen von TAPE-2 nach TAPE-1.	Den TAPE-2-Schalter ⑤ drücken.	Aufnahme	Wiedergabe	

FONCTIONNEMENT

Positionnez les commutateurs comme vous le désirez et actionnez l'interrupteur d'alimentation (POWER) ① .
Pour éviter un volume sonore excessif, tournez complètement la commande de VOLUME ⑫ vers la gauche et réglez-la.
Pour les commandes non mentionnées ici, reportez-vous à "PANNEAU AVANT", page 6.

SELECTION DE SOURCE		SOURCE SELECTOR ⑥ ~ ⑩	PHONO SELECTOR ㉓	CARTRIDGE ㉑
Disques → Branchez la platine à la bonne prise.	• PHONO-1 * Pour l'emploi d'une cellule à bobine mobile délivrant 0,1 — 5 mV ou à aimant mobile délivrant 1 — 10 mV.	Appuyer sur la touche PHONO ⑩ . Remarque: Réglez le commutateur CARTRIDGE ㉑ et les sélecteurs CARTRIDGE LOAD du panneau arrière en vous référant à "SELECTION DE CELLULE", page 16.	A mettre sur "1".	A mettre sur "MC" avec cellule à bobine mobile délivrant 0,1 — 1 mV et sur "MM" avec une cellule à aimant mobile délivrant 1 — 10 mV ou à bobine mobile délivrant 1 — 5 mV.
	• PHONO-2 * Pour l'emploi d'une cellule à bobine mobile délivrant 0,05 — 0,1 mV.		A mettre sur "2".	———
Emissions radio FM ou AM.		Appuyer sur la touche TUNER ⑨.	———	———
Pour écouter une source branchée aux bornes AUX.		Appuyer sur la touche AUX ⑧.	———	———
Bande → Raccorder la platine magnétophone.	• TAPE-1	Appuyer sur la touche TAPE-1 ⑦.	———	———
	• TAPE-2	Appuyer sur la touche TAPE-2 ⑥.	———	———



		REC SELECTOR ⑤, ⑯ ~ ⑳	Magnétophone		Remarque
			TAPE-1	TAPE-2	
Sélection d'enregistrement		Appuyer sur la touche PHONO ⑲.	N'importe laquelle des deux platines magnétophone peut enregistrer.		• Comme le sélecteur d'enregistrement et celui de source sont câblés en parallèle, ils fonctionnent indépendamment. Il est donc possible d'enregistrer une émission radio ou de copier une bande tout en écoutant un disque. • Pour faire le monitoring d'un enregistrement sur une platine trois-têtes, appuyer sur la touche TAPE -1 ⑦ pour la platine TAPE-1 ou sur la touche TAPE-2 ⑥ pour la platine TAPE-2. • Pour régler le niveau d'enregistrement, servez-vous de la commande de volume du magnétophone.
		Appuyer sur la touche TUNER ⑱.			
		Appuyer sur la touche AUX ⑰.			
	Pour copier de TAPE-1 à TAPE-2.	Appuyer sur la touche TAPE-1 ⑯.	Lecture	Enregistrement	
	Pour copier de TAPE-2 à TAPE-1.	Appuyer sur la touche TAPE-2 ⑤.	Enregistrement	Lecture	

CARTRIDGE SELECTION
TONABNEHMERWAHL
SELECTION DE CELLULE

CIRCUIT CONSTRUCTION

The PHONO 1 and PHONO 2 lines are provided for PHONO input; select the line with the PHONO SELECTOR and set the CARTRIDGE switch to "MM" or "MC".

- **PHONO-1 (MM)**
  Set the CARTRIDGE switch to this position to obtain 2.5 mV center output, 35.5 dB (59 times) gain and 300 mV acceptable input corresponding to a 1 mV – 10 mV output MM cartridge. When the rated input (2.5 mV) is applied to this unit, about 150 mV output comes from the REC OUT terminals.
  The CARTRIDGE LOAD selectors are provided on the rear panel for the selection of the load.
  Normally set this to 47 kohms and 47 PF; when using a 1 – 5 mV output cartridge, set to 100 ohms and 47 PF.

- **PHONO-1 (MC)**
  Set the CARTRIDGE switch to this position to obtain 0.2 mV center output, about 58 dB (794 times) gain and 24 mV acceptable input corresponding to a 0.1 mV – 1 mV output MC cartridge.
  Set the rear panel CARTRIDGE LOAD selectors to 100 ohms or 47 ohms and 47 PF.

- **PHONO-2 (MC)**
  Set the CARTRIDGE switch to this position to obtain 0.07 mV center output, about 67 dB (2,240 times) gain and 8.4 mV acceptable input corresponding to a 0.05 mV – 0.1 mV low-output MC cartridge. Set the CARTRIDGE LOAD selector to the position closest to the specified load resistance of the cartridge employed; 10 ohms, 47 ohms or 100 ohms.

  Note:
  - **When switching the PHONO SELECTOR or the CARTRIDGE switch, sound will be interrupted temporarily. This is due to a coupled muting circuit, not a malfunction.**

SCHALTUNGSAUFBAU

Für den Anschluß eines Plattenspielers sind die PHONO 1-Buchsen und die PHONO 2-Buchsen vorgesehen, wählen Sie den Eingang mit dem PHONO SELECTOR und stellen Sie den CARTRIDGE-Schalter auf "MM" oder "MC".

- **PHONO-1 (MM)**
  Stellen Sie den CARTRIDGE-Schalter auf diese Position, um 2,5 mV Mittenausgang, 35,5 dB Verstärkung (59fach) und 300 mV zulässiger Eingang entsprechend einem magnetischen Tonabnehmer mit 1 – 10 mV Ausgang zu erhalten. Wenn diesem Gerät der Nenneingang (2,5 mV) zugeführt wird, liegt an den REC OUT-Buchsen 150 mV Ausgang an. Die CARTRIDGE LOAD-Wähler an der Rückplatte dienen zur Wahl der Last. Normalerweise sollten 47 kOhm und 47 pF eingestellt sein. Wenn ein Tonabnehmer mit 1 – 5 mV Ausgang benutzt wird, sollte 100 Ohm und 47 pF eingestellt werden.

- **PHONO-1 (MC)**
  Stellen Sie den CARTRIDGE-Schalter auf diese Position, um 0,2 mV Mittenausgang, 58 dB Verstärkung (794fach) und 24 mV zulässiger Eingang entsprechend einem dynamischen Tonabnehmer mit 0,1 – 1 mV Ausgang zu erhalten.
  Stellen Sie die CARTRIDGE LOAD-Wähler an der Rückplatte auf 100 Ohm oder 47 Ohm und 47 pF.

- **PHONO-2 (MC)**
  Stellen Sie den CARTRIDGE-Schalter auf diese Position, um 0,07 mV Mittenausgang, 67 dB Verstärkung (2.240fach) und 8,4 mV zulässiger Eingang entsprechend einem dynamischen Tonabnehmer mit niedrigem Ausgang (0,05 – 0,1 mV) zu erhalten. Stellen Sie den CARTRIDGE LOAD-Wähler auf die der angegebenen Lastwiderstand des Tonabnehmers nächsten Position, 10 Ohm, 47 Ohm oder 100 Ohm.

  Hinweis:
  - **Beim Schalten des PHONO SELECTOR- oder CARTRIDGE-Schalters wird der Ton kurzzeitig unterbrochen. Dies wird von einer gekoppelten Dämpfungsschaltung bewirkt und ist keine Fehlfunktion.**

CONSTRUCTION DES CIRCUITS

Les lignes PHONO-1 et PHONO-2 sont prévues comme entrées PHONO; sélectionnez la ligne avec le sélecteur PHONO et mettez le commutateur de cellule (CARTRIDGE) sur "MM" ou "MC".

- **PHONO-1 (MM)**
  Mettre le commutateur CARTRIDGE sur cette position pour avoir une sortie médiane de 2,5 mV, un gain de 35,5 dB (59 fois) et une entrée admissible de 300 mV correspondant à une cellule à aimant mobile délivrant 1 mV – 10 mV. Lorsqu'on fournit l'entrée nominale (2,5 mV) à l'appareil, il délivre environ 150 mV aux bornes REC OUT. Les sélecteurs de charge de cellule (CARTRIDGE LOAD) du panneau arrière permettent le réglage de la charge.
  Utiliser normalement 47 ohms et 47 PF; avec une cellule délivrant 1 – 5 mV, se mettre sur 100 ohms et 47 PF.

- **PHONO-1 (MC)**
  Mettre le commutateur CARTRIDGE sur cette position pour avoir une sortie médiane de 0,2 mV, un gain de d'environ 58 dB (794 fois) et une entrée admissible de 24 mV correspondant à une cellule à bobine mobile délivrant 0,1 mV – 1 mV.
  Mettre les sélecteurs CARTRIDGE LOAD du panneau arrière sur 100 ohms ou 47 ohms et 47 PF.

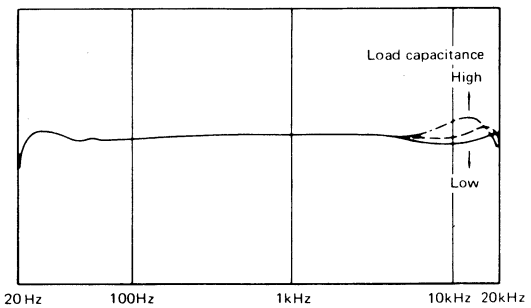
- **PHONO-2 (MC)**
  Mettre le commutateur CARTRIDGE sur cette position pour avoir une sortie médiane de 0,07 mV, un gain d'environ 67 dB (2.240 fois) et une entrée admissible correspondant à une cellule à bobine mobile à faible niveau de sortie de 0,05 mV – 0,1 mV. Mettre les sélecteurs CARTRIDGE LOAD sur la position la plus proche de la résistance de charge caractéristique de la cellule employée: 10 ohms, 47 ohms ou 100 ohms.

Remarque:

- **Lors du fonctionnement des commutateurs PHONO SELECTOR et CARTRIDGE, le son est momentanément coupé. Cela est dû à une circuit silencieux couplé et non à un défaut de fonctionnement.**

CARTRIDGE LOAD SELECTOR

- **PHONO-1**
  The characteristic of the MM cartridges differs according to load resistance and capacitance; the load resistance is generally 50 kohms but the capacitance is not specified for most of them. Because the resonance peak is produced by the cartridge reactance element and the load capacitance, the change of characteristic varies with the load capacitance as shown.

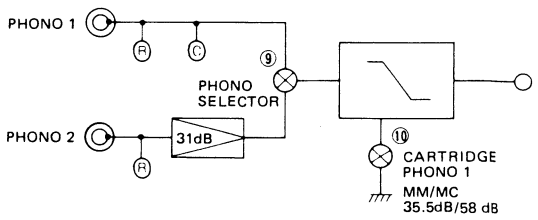


Characteristic with load capacitance

Note:

- **The characteristic shown in the upper diagram is one example. Not all cartridges change like this.**

In an ordinary amplifier, shielded wire is used to connect the PHONO terminals to the input selection of equalizer circuit. But recently, the disposition of parts has been changed to shorten the shielded wire to improve the high frequency characteristic. Therefore, even if the turntable characteristic is flat, it is possible to adjust the capacitance select switch to obtain the higher frequency desired. Normally, 47 kohms and 47 PF are standard, but as the specified load impedance of the high-output (1 mV – 5 mV) and the medium output (0.2 mV – 1 mV) MC cartridge is usually less than 100 ohms, 100 ohms and 47 ohms positions are provided.



PHONO block diagram

- **PHONO-2**

  As the load impedance of the low-output (0.07 mV – 0.1 mV) MC cartridge is 3.3 ohms – 100 ohms, three positions of 10 ohms, 47 ohms and 100 ohms are provided. Use these positions according to the specified load of the cartridge. Since the inductance element of the MC cartridge is small, a noticiable change of the frequency characteristic (like that of the MM cartridge) does not appear, but the output of the cartridge will change markedly. Therefore, choose the same or higher load impedance than that specified for the cartridge. If the specified load is unknown, use the 100 ohms position.

		Input sensitivity	Input impedance	Cartridge used
PHONO-1	MM	2.5 mV	47 kohms	MM type
			100 ohms 47 ohms	High-output MC type
	MC	0.2 mV	100 ohms 47 ohms	MC standard type
PHONO-2		0.07 mV	100 ohms 47 ohms 10 ohms	Low-output MC type

Input sensitivity and input impedance

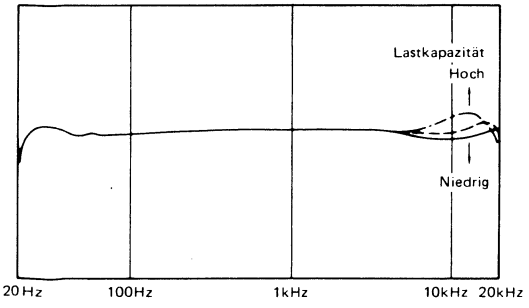
Note:

- **When connecting the signal cord of the turntable or switching the CARTRIDGE LOAD selector, set the VOLUME control to minimum or the POWER switch to OFF to prevent noise.**

TONABNEHMERLAST-WÄHLER (CARTRIDGE LOAD SELECTOR)

- **PHONO-1**

  Die Charakteristika von magnetischen Tonabnehmern schwanken entsprechend des Lastwiderstands und der Kapazität. Der Lastwiderstand beträgt im allgemeinen 50 kOhm, aber die Kapazität ist meistens nicht angegeben. Da die Resonanzspitze durch die Reaktanz des Tonabnehmers und die Lastkapazität erzeugt wird, variieren die Wechsel der Charakteristika mit der Lastkapazität, siehe Abbildung.

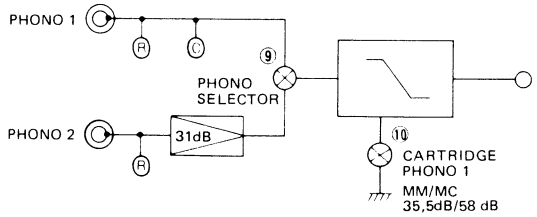


Charakteristika mit Lastkapazität

Hinweis:

- **Die in der oberen Abbildung gezeigten Charakteristika sind ein Beispiel. Nicht alle Tonabnehmer wechseln wie dieser.**

In einem gewöhnlichen Verstärker werden zum Verbinden der PHONO-Buchsen mit der Eingangswahl der Entzererschaltung abgeschirmte Leitungen verwendet. Seit kurzem werden die Teile jedoch anders angeordnet, um die abgeschirmten Leitungen zu verkürzen und um die Charakteristika der hohen Frequenzen zu verbessern. Deshalb ist es möglich, auch wenn die Plattenspieler-Charakteristika flach sind, durch die Einstellung des Kapazität-Wahlschalters die gewünschten höheren Frequenzen zu erhalten. Normalerweise sind 47 kOhm und 47 pF die Standardeinstellungen, aber da die spezifischen Lastimpedanzen von dynamischen Tonabnehmern mit hohem Ausgang (1 – 5 mV) und mittlerem Ausgang (0,2 – 1 mV) gewöhnlich unter 100 Ohm betragen, ist das Gerät mit 100 Ohm- und 47 Ohm-Positionen ausgestattet.



PHONO-Blockschaltbild

- **PHONO-2**

  Da die Lastimpedanz von dynamischen Tonabnehmern mit niedrigem Ausgang (0,07 – 0,1 mV) 3,3 – 100 Ohm beträgt, sind drei Positionen mit 10 Ohm, 47 Ohm und 100 Ohm vorhanden. Verwenden Sie diese Positionen entsprechend der spezifizierten Last des Tonabnehmers. Da die Induktivität von dynamischen Tonabnehmern klein ist, tritt keine merkliche Änderung der Frequenzcharakteristik auf (wie bei magnetischen Tonabnehmern), der Ausgang des Tonabnehmers ändert sich jedoch merklich. Wählen Sie deshalb die gleiche oder eine höhere Lastimpedanz als die für den Tonabnehmer spezifizierte. Wenn die spezifizierte Last nicht bekannt ist, verwenden Sie die 100 Ohm-Position.

		Eingangsempfindlichkeit	Eingangsimpedanz	Verwendeter Tonabnehmer
PHONO-1	MM	2,5 mV	47 kOhm	Magnetischer Tonabnehmer
			100 Ohm 47 Ohm	Dynamischer Tonabnehmer mit hohem Ausgang
	MC	0,2 mV	100 Ohm 47 Ohm	Dynamischer Standard-Tonabnehmer
PHONO-2		0,07 mV	100 Ohm 47 Ohm 10 Ohm	Dynamischer Tonabnehmer mit niedrigem Ausgang

Eingangsempfindlichkeit und Eingangsimpedanz

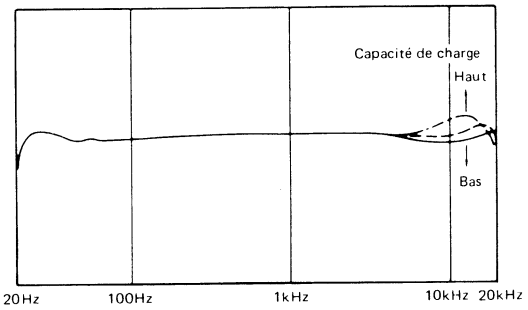
Hinweis:

- **Stellen Sie beim Anschließen der Signalleitung des Plattenspielers und beim Schalten des CARTRIDGE LOAD-Wählers den Lautstärkeregler auf Minimum oder den Netzschalter auf Aus, um Störgeräusche zu vermeiden.**

SELECTEUR DE CHARGE DE CELLULE

- **PHONO-1**

Les caractéristiques des cellules à aimant mobile diffèrent en fonction de leur résistance de charge et de leur capacité; la résistance de charge est généralement de 50 kohms, mais, dans la plupart des cas la capacité n'est pas spécifiée. Comme la pointe de résonance est produite dans la cellule par l'élément de réactance et la capacité de charge, la modification des caractéristiques se fait selon la capacité comme nous l'indiquons.



Caractéristiques et capacité de charge

Remarque:

- **La caractéristique figurant sur le diagramme supérieur est un exemple. Toutes les cellules ne réagissent pas comme cela.**

Dans les amplificateurs courants, un câble blindé sert à raccorder les bornes PHONO au sélecteur d'entrée du circuit égaliseur. Depuis peu, on a modifié la disposition des composants pour raccourcir le câble blindé et améliorer la restitution des hautes fréquences. C'est pourquoi, même si les caractéristiques de la platine sont linéaires, il est possible de régler le sélecteur de capacité pour obtenir la plus haute fréquence désirée.
Normalement, les valeurs standard sont 47k ohms et 47 PF, mais comme l'impédance de charge caractéristique des cellules à bobine mobile à haut (1 mV – 5 mV) et moyen (0,2 mV – 1 mV) niveau de sortie est généralement inférieure à 100 ohms, des positions 100 ohms et 47 ohms sont prévues.

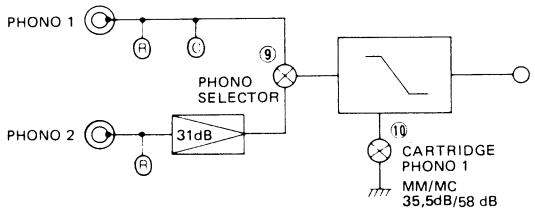


Schéma PHONO

- **PHONO-2**

Comme l'impédance de charge des cellules à bobine mobile à faible niveau de sortie (0,07 mV – 0,1 mV) va de 3,3 ohms à 100 ohms, trois positions, 10 ohms, 47 ohms et 100 ohms, sont prévues. Servez-vous-en selon la charge caractéristique de la cellule. Comme l'élément inductif des cellules à bobine mobile est faible, aucune modification notable des caractéristiques en fréquence n'apparait, mais le niveau de sortie diffère nettement. Choisissez donc une impédance égale ou supérieure à celle de la cellule. Si cette dernière n'est pas connue, prenez la position 100 ohms.

		Sensibilité d'entrée	Impédance d'entrée	Cellule utilisée
PHONO-1	MM	2,5 mV	47 kohms	Type à aimant mobile
			100 ohms 47 ohms	Type à bobine mobile à haut niveau de sortie
	MC	0,2 mV	100 ohms 47 ohms	Type à bobine mobile standard
PHONO-2		0,07 mV	100 ohms 47 ohms 10 ohms	Type à bobine mobile à faible niveau de sortie

Sensibilité et impédance d'entrée

Remarque:

- **Lors du branchement du câble de signal de la platine ou de l'emploi du sélecteur CARTRIDGE LOAD, mettez la commande de VOLUME au minimum ou arrêtez l'appareil pour éviter les bruits parasites.**

S.E.A. GRAPHIC EQUALIZER

When connecting the SEA graphic equalizer, connect the TAPE-1 terminals of this unit to the SEA LINE terminals as follows.
TAPE-1 REC – SEA LINE IN
TAPE-1 PLAY – SEA LINE OUT
Press the TAPE-1 switch to activate the SEA graphic equalizer. The TAPE-1 indicator will light. Then select the input signal with the REC SELECTOR.
When using two tape decks, use the SEA TAPE terminals.

S.E.A.-MEHRBEREICHKLANG-REGLER

Schließen Sie beim Anschluß des SEA-Mehrbereichklangreglers die TAPE-1-Buchsen dieses Geräts wie folgt an die SEA LINE-Buchsen an.
TAPE-1 REC – SEA LINE IN
TAPE-1 PLAY – SEA LINE OUT
Drücken Sie den TAPE-1-Schalter, um den SEA-Mehrbereich-klangregler zu aktivieren. Die TAPE-1-Anzeige leuchtet. Wählen Sie dann das Eingangssignal mit dem REC SELECTOR.
Verwenden Sie bei zwei Tonbanddecks die SEA TAPE-Buchsen.

EGALISEUR GRAPHIQUE S.E.A.

Pour raccorder un égaliseur graphique SEA, reliez les bornes TAPE-1 de cet appareil aux bornes LINE du SEA, comme suit.
TAPE-1 REC – SEA LINE IN
TAPE-1 PLAY – SEA LINE OUT
Appuyez sur la touche TAPE-1 pour mettre en service l'égaliseur graphique. Le témoin TAPE-1 s'allume. Choisissez alors le signal d'entrée avec le sélecteur d'enregistrement (REC SELECTOR).
Pour employer deux platines magnétophone, se servir des bornes TAPE du SEA.

TROUBLESHOOTING

What appears to be a malfunction may not always be serious in the following situations, make sure first .....

No sound

Is the MUTING indicator lit?

– Press the MUTING switch so that the indicator goes out.

Is the short-circuit pin inserted in the REC terminal?

– Store it properly.

Is the VOLUME control turned fully counterclockwise ( )?

– Turn it clockwise ( ) to set to any desired level.

Extremely small and degraded sound

Is the CARTRIDGE switch pressed improperly?

– Press this switch according to the cartridge used, to MM or MC.

Is the CARTRIDGE LOAD selector set improperly?

– Set this selector according to your cartridge.

Is the turntable connected to the PHONO terminals correctly according to the cartridge used?

– Select the PHONO terminals according to the cartridge to be used.

Impossible to record

Is the REC OFF button pressed?

– Press the REC SELECTOR corresponding to the program source.

Impossible to adjust the tone

Are the DIRECT and TONE switches pressed improperly?

– Set the DIRECT switch to OFF and the TONE switch to ON, and it will then be possible to control the tone with the BASS and TREBLE controls.

FEHLERSUCHE

Was wie eine Störung erscheint, muß nicht immer ernsthaft sein. Überprüfen Sie in den folgenden Fällen zuerst .....

Kein Ton

Leuchtet die MUTING-Anzeige?

– Drücken Sie den MUTING-Schalter, so daß die Anzeige ausgeht.

Ist der Kurzschlußstecker an der REC-Buchse angeschlossen?

– Nehmen Sie den Stecker ab.

Steht der Lautstärkeregler auf Minimum ( )?

– Stellen Sie die gewünschte Lautstärke ein ( ).

Sehr leiser und schlechter Klang

Ist der CARTRIDGE-Schalter richtig eingestellt?

– Stellen Sie den Schalter entsprechend des verwendeten Tonabnehmers auf MM oder MC ein.

Ist der CARTRIDGE LOAD-Wähler richtig eingestellt?

– Stellen Sie den Wähler entsprechend des verwendeten Tonabnehmers ein.

Ist der Plattenspieler entsprechend des verwendeten Tonabnehmers richtig an die PHONO-Buchsen angeschlossen?

– Schließen Sie den Plattenspieler entsprechend des verwendeten Tonabnehmers an die PHONO-Buchsen an.

Aufnahme nicht möglich

Ist die REC OFF-Taste gedrückt?

– Drücken Sie eine REC SELECTOR-Taste entsprechend der Quelle.

Klangregelung ist nicht möglich

Ist der DIRECT- oder der TONE-Schalter falsch eingestellt?

– Schalten Sie den DIRECT-Schalter auf OFF und den TONE-Schalter auf ON, dann kann der Klang mit den BASS- und TREBLE-Reglern eingestellt werden.

EN CAS DE FONCTIONNEMENT ANORMAL

Ce qui peut sembler un défaut de fonctionnement n'en est pas toujours réellement un; dans une telle situation, vérifiez d'abord .....

Pas de son

Le témoin de sourdine (MUTING) est-il allumé?

– Appuyez sur la touch MUTING; le témoin doit s'éteindre.

Le cavalier de court-circuit est-il inséré dans les bornes REC?

– Conservez-le en lieu sûr.

La commande de VOLUME est-elle complètement tournée dans le sens inverse des aiguilles d'une montre ( )?

– Tournez-la dans l'autre sens ( ) sur le niveau désiré.

Son très failble ou dégradé

Le commutateur de cellule est-il incorrectement enfoncé?

– Tenez compte, pour sa position, de la cellule employée, bobine mobile ou aimant mobil.

Le sélecteur de charge de cellule (CARTRIDGE LOAD) est-il mal réglé?

– Réglez-le en fonction de votre cellule.

La platine est-elle branchée aux bornes PHONO en tenant compte de la cellule employée?

– Choisissez vos bornes PHONO en fonction de la cellule employée.

Enregistrement impossible

La touche REC OFF est-elle enfoncée?

– Appuyez sur le sélecteur d'enregistrement (REC SELECTOR) en fonction de la source désirée.

Tonalité impossible à régler

Les touches DIRECT et TONE sont-elles incorrectement enfoncées?

– Mettez la touche DIRECT sur OFF et la touche TONE sur ON; il est alors possible de régler la tonalité avec les commandes BASS et TREBLE.

SPECIFICATIONS

Input terminals
Rated sensitivity/impedance (1 kHz)/Capacitance
PHONO-1 (MM): 2.5 mV/47 kohms, 100 ohms, 47 ohms/470 pF, 220 pF, 47 pF
PHONO-1 (MC): 200 μV/47 kohms, 100 ohms, 47 ohms/470 pF, 220 pF, 47 pF
PHONO-2 (MC): 70 μV/100 ohms, 47 ohms, 10 ohms
TUNER : 150 mV/47 kohms
AUX : 150 mV/47 kohms
TAPE-1, 2 : 150 mV/47 kohms

Output terminals
Rated output voltage/impedance (1 kHz)
PRE OUT : 2 V/220 ohms (DIRECT)
REC OUT : 150 mV/220 ohms (PHONO)

Distortion
PHONO-1 (MM): 0.002 % (20 Hz – 20 kHz, at 15 V REC OUT output)
PHONO-1 (MC): 0.002 % (20 Hz – 20 kHz, at 15 V REC OUT output)
PHONO-2 (MC): 0.002 % (20 Hz – 20 kHz, at 15 V REC OUT output)
AUX : 0.002 % (20 Hz – 20 kHz, at 10 V PRE OUT output)

Signal-to-Noise ratio
(IHF-A network, short-circuited/IHF A-202/DIN)
PHONO-1 (MM): 85 dB/84 dB/92 dB
PHONO-1 (MC): 68 dB/77 dB/82 dB
PHONO-2 (MC): 68 dB/76 dB/76 dB
TUNER : 105 dB/100 dB/110 dB
AUX : 105 dB/100 dB/110 dB
TAPE-1, 2 : 105 dB/100 dB/110 dB

PHONO overload (1 kHz, 0.002 % distortion)
PHONO-1 (MM): 300 mV
PHONO-1 (MC): 24 mV
PHONO-2 (MC): 8.4 mV

RIAA Phono
Equalization : ±0.2 dB (20 Hz – 20 kHz)

Tone controls
TREBLE : ±8 dB (10 kHz)
BASS : ±8 dB (100 Hz)
Subsonic filter : 18 Hz (-6 dB/oct)
Muting level : -20 dB
Power source : See page 24
Dimensions : 460 (W) x 144 (H) x 420 (D) mm (18-1/8" (W) x 5-11/16" (H) x 16-9/16" (D))
Weight : 12 kg (26.4 lbs)

Design and specifications subject to change without notice.

TECHNISCHE DATEN

Eingangsbuchsen
(Nennempfindlichkeit/Impedanz (1 kHz)/Kapazität)
PHONO-1 (MM): 2,5 mV/47 kOhm, 100 Ohm, 47 Ohm/470 pF, 220 pF, 47 pF
PHONO-1 (MC): 200 μV/47 kOhm, 100 Ohm, 47 Ohm/470 pF, 220 pF, 47 pF
PHONO-2 (MC): 70 μV/100 Ohm, 47 Ohm, 10 Ohm
TUNER : 150 mV/47 kOhm
AUX : 150 mV/47 kOhm
TAPE-1, -2 : 150 mV/47 kOhm

Ausgangsbuchsen
(Nenn-Ausgangsspannung/Impedanz (1 kHz))
PRE OUT : 2 V/220 Ohm (DIRECT)
REC OUT : 150 mV/220 Ohm (PHONO)

Verzerrung
PHONO-1 (MM): 0,002% (20 Hz – 20 kHz bei 15 V REC OUT-Ausgang)
PHONO-1 (MC): 0,002% (20 Hz – 20 kHz bei 15 V REC OUT-Ausgang)
PHONO-2 (MC): 0,002% (20 Hz – 20 kHz bei 15 V REC OUT-Ausgang)
AUX : 0,002% (20 Hz – 20 kHz bei 10 V REC OUT-Ausgang)

Störspannungsabstand
(IHF-A-Netzwerk, kurzgeschlossen/IHF A-202/DIN)
PHONO-1 (MM): 85 dB/84 dB/92 dB
PHONO-1 (MC): 68 dB/77 dB/82 dB
PHONO-2 (MC): 68 dB/76 dB/76 dB
TUNER : 105 dB/100 dB/110 dB
AUX : 105 dB/100 dB/110 dB
TAPE-1, -2 : 105 dB/100 dB/110 dB

PHONO-Überbelastung (1 kHz, 0,002% Verzerrung)
PHONO-1 (MM): 300 mV
PHONO-1 (MC): 24 mV
PHONO-2 (MC): 8,4 mV

RIAA-Plattenspieler-
Entzerrung : ±0,2 dB (20 Hz – 20 kHz)

Klangregler
TREBLE : ±8 dB (10 kHz)
BASS : ±8 dB (100 Hz)
Unterschallfilter: 18 Hz (-6 dB/Okt.)
Dämpfpegel : -20 dB
Spannungsversorgung : Siehe Seite 24
Abmessungen : 460 (B) x 144 (H) x 420 (T) mm
Gewicht : 12 kg

Technische Änderungen vorbehalten.

CARACTERISTIQUES TECHNIQUES

Bornes d'entrée
Sensibilité/impédance nominale (1 kHz)/Capacité
PHONO-1 (MM) : 2,5 mV/47 kohms, 100 ohms, 47 ohms/ 470 pF, 220 pF, 47 pF
PHONO-1 (MC) : 200 μV/47 kohms, 100 ohms, 47 ohms/ 470 pF, 220 pF, 47 pF
PHONO-2 (MC) : 70 μV/100 ohms, 47 ohms, 10 ohms
TUNER : 150 mV/47 kohms
AUX : 150 mV/47 kohms
TAPE-1, 2 : 150 mV/47 kohms

Bornes d'entrée
Tension/impédance de sortie nominal (1 kHz)
PRE OUT : 2 V/220 ohms (DIRECT)
REC OUT : 150 mV/220 ohms (PHONO)

Distorsion
PHONO-1 (MM) : 0,002 % (20 Hz – 20 kHz, à 15 V de sortie de REC OUT)
PHONO-1 (MC) : 0,002 % (20 Hz – 20 kHz, à 15 V de sortie de REC OUT)
PHONO-2 (MC) : 0,002 % (20 Hz – 20 kHz, à 15 V de sortie de REC OUT)
AUX : 0,002 % (20 Hz – 20 kHz, à 10 V de sortie de REC OUT)

Rapport signal/bruit
(Réseau IHF-A, court-circuit/IHF A-202/DIN)
PHONO-1 (MM) : 85 dB/84 dB/92 dB
PHONO-1 (MC) : 68 dB/77 dB/82 dB
PHONO-2 (MC) : 68 dB/76 dB/76 dB
TUNER : 105 dB/100 dB/110 dB
AUX : 105 dB/100 dB/110 dB
TAPE-1, 2 : 105 dB/100 dB/110 dB

Capacité de surcharge PHONO (1 kHz, 0,002 % de distorsion)
PHONO-1 (MM) : 300 mV
PHONO-1 (MC) : 24 mV
PHONO-2 (MC) : 8,4 mV

Egalisation phono de RIAA : ±0,2 dB (20 Hz – 20 kHz)

Commandes de tonalité
Aiguës : ±8 dB (10 kHz)
Graves : ±8 dB (100 Hz)
Filtre passe-bas : 18 Hz (-6dB/oct)
Niveau de silencieux : -20 dB
Source d'alimentation : Voir page 24
Dimensions : 460 (L) x 144 (H) x 420 (P) mm
Poids : 12 kg

Présentation et caractéristiques modifiables sans préavis.

Differences Between Models Intended For Different Areas

	USA	Continental Europe	UK	Other areas
Power supply	AC 120 V, 60 Hz	AC 220 V∿, 50 Hz	AC 240 V∿, 50 Hz	AC 110/120/220/240 V∿ selectable, 50/60 Hz
Power consumption	73 watts	73 watts	73 watts	73 watts
Line voltage selector	Not fitted	Not fitted	Not fitted	Fitted
Power outlet	Fitted	Not fitted	Not fitted	Fitted

Unterschiede zwischen Modellen, die für verschiedene Länder bestimmt sind

	USA	Europa (Kontinent)	Großbritannien	Andere Länder
Spannungsversorgung	Netz 120 V, 60 Hz	Netz 220 V∿, 50 Hz	Netz 240 V∿, 50 Hz	Netz 110/120/220/240 V∿ umschaltbar, 50/60 Hz
Leistungsaufnahme	73 Watt	73 Watt	73 Watt	73 Watt
Netzspannungswähler	Nicht vorhanden	Nicht vorhanden	Nicht vorhanden	Vorhanden
Spannungsausgang	Vorhanden	Nicht vorhanden	Nicht vorhanden	Vorhanden

Différences existant entre les modèles destinés pour différents pays

	Etats-Unis	Europe continentale	Royaume-Uni	Autres pays
Alimentation	CA 120 V, 60 Hz	CA 220 V∿, 50 Hz	CA 240 V∿, 50 Hz	CA 110/120/220/240 V∿ commutable, 50/60 Hz
Consommation	73 watts	73 watts	73 watts	73 watts
Sélecteur de tension du secteur	Inexistant	Inexistant	Inexistant	Existant
Prise de sortie secteur	Existant	Inexistant	Inexistant	Existant

Vol.8

P-L10
TECHNICAL MANUAL

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1. Basic Circuits

1-1 Preface

These several years, the digital audio has presented a variety of topics as a new audio source. The incoming of the digital audio age is now unavoidable. The digital audio will come into general use henceforth. For the time being, with this superb audio source, the sound signal is analogically amplified for reproduction.

In this situation, when audio sources are upgraded by use of digital audio equipment, it is required to further improve amplifier and speaker performance, for which it is most important to extend the dynamic range.

The dynamic range of the amplifier is relatively easy to extend at upper signal level, while at lower signal level it is not easy in respect to the S/N ratio as well. Especially for the preamplifier, it is important to extend the dynamic range at lower signal level and its dynamic characteristic needs to be improved for the noise quality, the degree of separation between sound and noise, not to mention the static noise level.

On the other hand, for the power amplifier, it is more needed to improve its dynamic characteristic against the speaker load for the purpose of driving the speakers in concurrence with the extension of the dynamic range at upper signal level. Here, let us introduce the newly developed Gm processor in reconsideration of amplification from completely new standpoint. This paper also deals with volume and equalizer amplifiers to which the Gm processor is applied.

1-2 Problems of Preamplifier Circuit

Among different sections of the preamplifier, those which have many problematic points in performance are the volume control section which must control the gain over 100 dB and the equalizer amplifier section which provides the RIAA characteristic by changing the gain by more than 40 dB for a given frequency.

In the volume control section, the output impedance varies greatly according to the control level and, in the equalizer amplifier section, the load impedance varies greatly according to the signal frequency. Therefore, both sections have fundametal problematic points as amplifiers.

The effect of these impedance changes on the amplifier circuit is eliminated in such a manner that the gain and frequency response is controlled by adjusting the voltage-current and current-voltage conversion rates in the conversion process of voltage→current→voltage but not by adjusting the gain with voltage mode as conventional.

Next, let us describe that Gm processor of the voltage-current conversion section which is the key to this system.

1-3 Gm processor (V-I converter)

Gm, termed the mutual conductance, is a ratio of the change in voltage to the change in current. gm is expressed as follows:

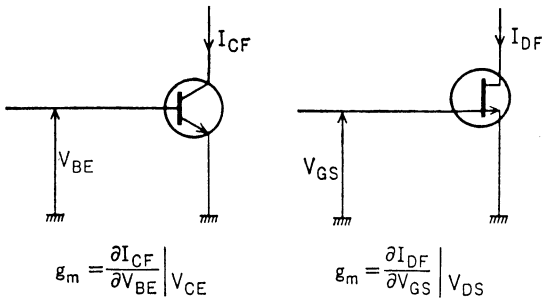
$$g_m = \frac{\Delta I}{\Delta E} (\mho)$$

For examples of transistor and FET, gm is as shown in (a) and (b) of Fig. 1. Especially, in the case of a transistor, it is expressed as follows:

$$g_m = \frac{q}{kT} |I_{CF}|$$

where, q is the charge of electrons,
k is the Boltzmann constant,
T is the absolute temperatures.

As seen from this, gm is greatly affected by the temperature and operating current.



(a) With transistor (b) With FET

Fig. 1 Gm of active element

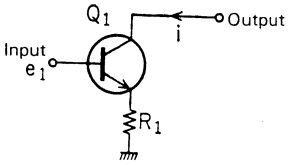


Fig. 2 Fundamental V-I converter circuit

Fig. 2 shows a fundamental V-I converter circuit. Current feedback resistor R1 is connected to the emitter of Q1 to prevent the deterioration of the linearity due to the change in gm' of Q1.
In this circuit, the input voltage is converted in to a current proportional to $\frac{g_m'}{R_1 g_m' + 1}$. For improved linearity, it is necessary to make the change of gm' against R1 sufficiently small. For this purpose, the even harmonic distortion is cancelled by connecting this circuit in symmetrical configuration or the change in gm' is countered by its equivalent. For all these countermeasures, the gm of the transistor greatly varies against Ic so that the linearity is deteriorated at high level input.
A V-I converter circuit using an OP amplifier which is shown in Fig. 3 is well known. Provided that $\frac{R_1}{R_4} = \frac{R_2}{R_3}$, this performs V-I conversion in the form of $gm = -\frac{1}{R_1}$. As this circuit uses NFB, V-I conversion is possible in high linearity. However, in high frequency range where NFB cannot be applied sufficiently, the constant current may vary or an input buffer is required to positively drive R1 which also acts as a noise source.

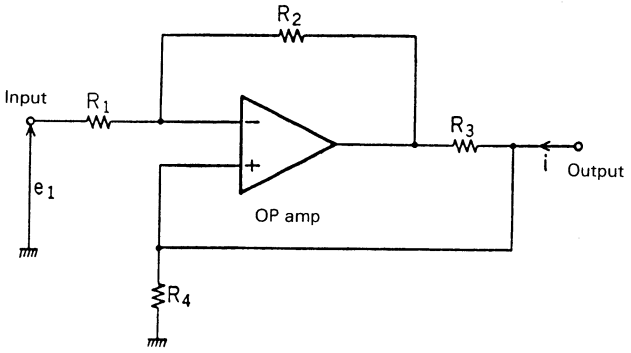


Fig. 3 V-I converter circuit with OP amp

The voltage-current conversion circuit is not sufficient to solve the problem of noise when the dynamic range is extended especially at lower signal level for higher linearity over wide frequency range from the viewpoint of the present audio performance.
Our newly developed voltage-current conversion circuit is configured as shown in Fig. 4. As amplifier A is a differential input amplifier with FET, the current flowing into the Gm processor is represented from Kirchhoff's law as follows: $i_1 + i_2 + i_3 + i_4 = 0$
Here, when the current is fixed in the relationship of $i_3 = -i_2$, $i_1 = -i_4$. Thus, currents i_1 and i_4 are in anti-phase with each other. This leads to a great merit to the volume amplfier described later.

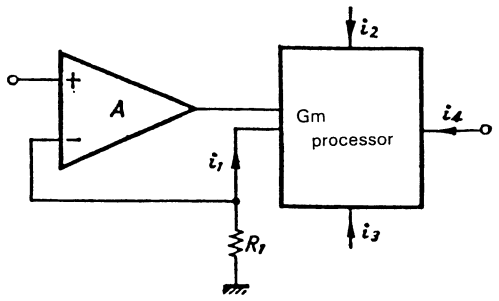


Fig. 4 Voltage-current conversion circuit by Gm processor

On the other hand, the voltage generated in R_1 by amplifier A is excellent in distortion, frequency and noise characteristics, as it is subject to adequate NFB. Therefore, current i_1 also has superb characteristics.
In addition, since the Gm processor, an entirely symmetrical circuit, performs a current operation inherent to transistors, the parameter of each processor element is little changed by the voltage.
Consequently, an anti-phase current with superb characteristics like current i_1 is emitted in the complete current operation.
Thus, R_1 determines the voltage-current conversion rate in the form of $Gm = \frac{1}{R_1}$.
As described here, the Gm processor voltage-current conversion circuit permits excellent noise characteristic and linearity over a wide frequency range at distortion rate of less than 0.0002%.

1-4 Application of Gm Processor to Volume Amplifier

Attenuation type 3-terminal VRs are commonly used for gain control. As previously mentioned, since various problems such as frequency response change due to impedance rise at the VR slider (output terminal), less S/N ratio due to noise increase and signal attenuation, distortion increase due to the effect on the following stage, induction from other equipment, etc. are present in practical use because the impedance varies according to the control level.

To avoid these problems, although low impedance VR is used in high class amplifiers to improve the performance to some extent, this VR is not sufficient for the practical S/N ratio. Therefore, even with low absolute impedance value, since the rate of impedance change is the same as before, the use of a low impedance VR gives no drastic solution.
Accordingly, the gain control at the amplifier side is assumable as a solution.

1-4-(1) Gain Control by Inverter amplifier

This is the simplest gain control as shown in Fig. 5. In this control system, a classical NF type tone control is applied to the volume amplifier, in which the NF amount of the inverter amplifier and the attenuation amount of the input side are combined. Howerver, this system has the following demerits:

a) When changing the VR setting, the input impedance varies greatly. Especially when setting the VR to increase the volume, the input impedance lowers extremely. In this system, the load to the previous stage is too heavy.
b) The NF amount changes greatly according to the VR setting to much alter the circuit operating condition.
c) At the inversion input side, since a VR is inserted in series with the signal as in the conventional attenuation type VR system, this may cause the sound quality to change.

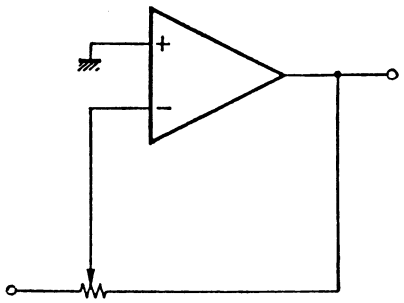


Fig. 5 Gain control circuit by inverter amplifier

The gain controls by current are intended as the second measure from the above points of demerit.

1-4-(2) Gain Control by Current-Voltage Conversion

Fig. 6 shows the gain control system by current-voltage conversion. In this system, after converting the signal voltage into a current, output voltage Vo is expressed at output current = Io from Ohm's law in the form of $Vo = Io \times R$. Thus, the gain controlled by changing load resistance R.
In other words, R simply determines the current-voltage conversion rate.
Accordingly, although some problems of the attenuation type VR system are solved, the next points remain problematic.

a) The most serious point is that distorted slider contact of the VR is more problematic than conventional.
b) The maximum attenuation amount by the contact resistance is limited.
c) Although the noise is reduced, the S/N ratio is only a little improved in practical use.

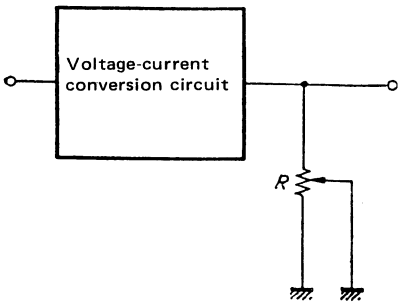


Fig. 6 Gain control circuit by current-voltage conversion

Against points a) and b), the improvement is possible to some degree when the VR is improved. However, this does not lead to drastic solution and some problems remain.
To solve the rest problems, the Gm processor system is developed.

1-4-(3) Gain Control by Gm Processor

This system controls both voltage-current and current-voltage conversion rates at the same time. Fig. 7 shows its block diagram. In such a connection, because of the operating principle of the Gm processor, the VR acts as the control of the current-voltage conversion rate by the load impedance in its right side of the VR slider and, in its left side, acts as the control of the voltage-current conversion rate.
When moving the slider to the right, both conversion rates become lower, while when moving it to the left, both become higher. Thus, the gain is varied greatly and the maximum attenuation amount which gives a demerit to system (2) is assured easily and sufficiently.

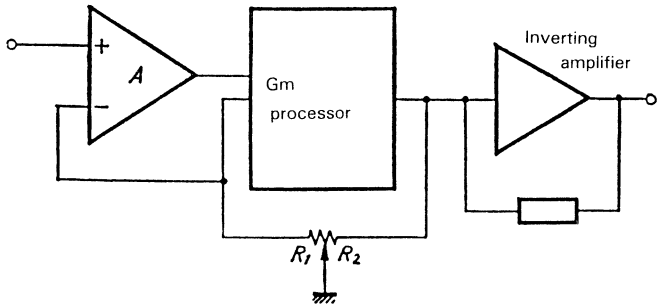


Fig. 7 Gain control circuit by Gm processor

In addition, since the voltage-current conversion rate is controlled together, the S/N ratio is much improved in practical use. Moreover, the greatest merit of this system is that it is basically free from the effects of contact resistance and contact distortion of the slider.
From the relationship of $i_1 = -i_4$ in Fig. 2, i_1 and i_4 are in anti-phase with each other and have the same absolute value. When this applies to Fig. 5, the currents flowing in the right and left sides of the VR slider are also in anti-phase with each other and have the same absolute value. Namely, current does not flow in the VR slider at all but in the VR resistive material alone.
Therefore, in this system serious problems relative to the VR (slider contact distortion, contact resistance, contact aging, etc.) are radically solved. Concerning the final output, the I/O relationship is changed into in-phase by the inverter amplifier and at the same time the impedance is converted.

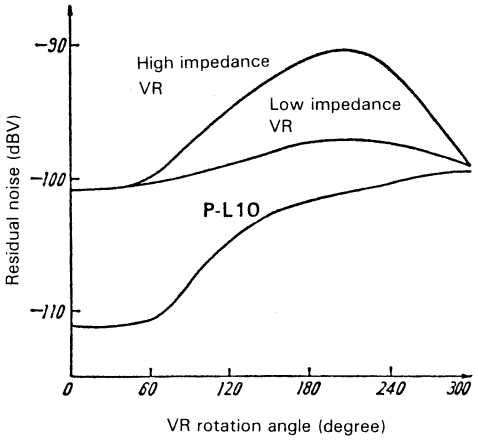


Fig. 8 Comparison in residual noise characteristic between Gm processor and convertional systems

Fig. 6 represents the comparison in residual noise characteristic between this system and the conventional system.

1-5 Application of Gm Processor to Equalizer Amplifier

The equalizer circuit is broadly divided into the NF type and the CR type, each with the next demerit counter to other. In the NF type, wide dynamic range is made easily but the response at high frequencies is not sufficient because of the RIAA circuit.
As the CR type is a flat amplifier, the response at high frequencies is good but the dynamic range at high frequencies is extremely narrow.
The system shown in Fig. 9 is created as a solution of these demerits by application of the Gm processor. The current signal which is voltage-current converted by the Gm processor is current-voltage converted by the inverter amplifier with an RIAA circuit in the feedback loop.

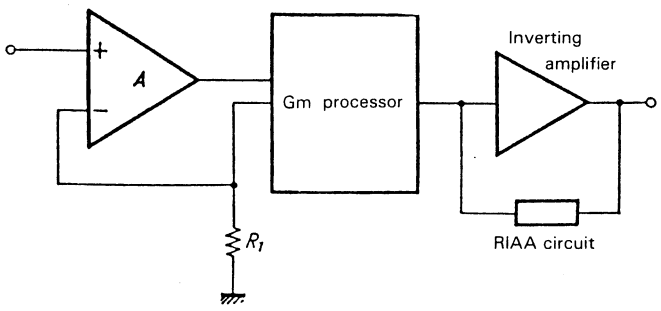


Fig. 9 Equalizer amplifier circuit by Gm processor

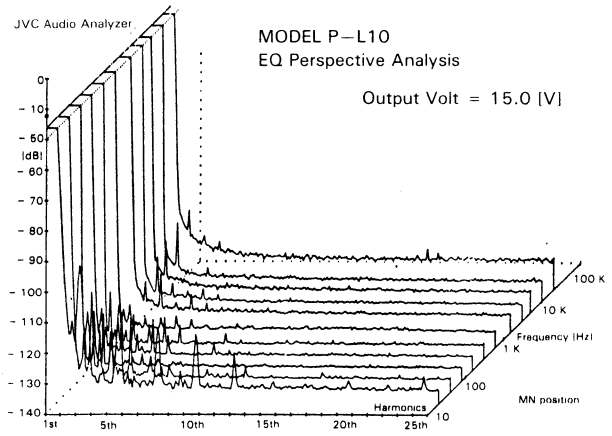


Fig. 10 P-L10 characteristic at MM position

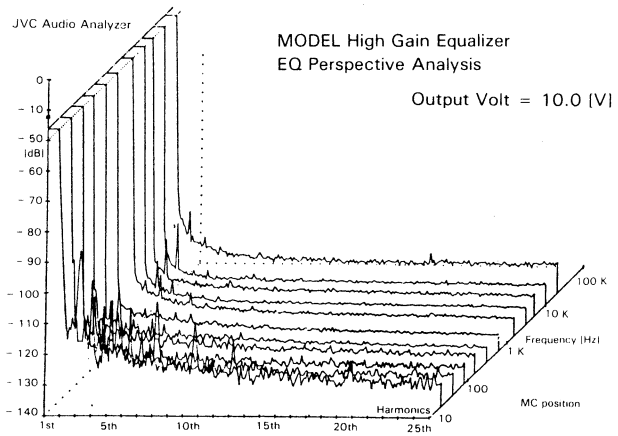


Fig. 11 P-L10 characteristic at MC position

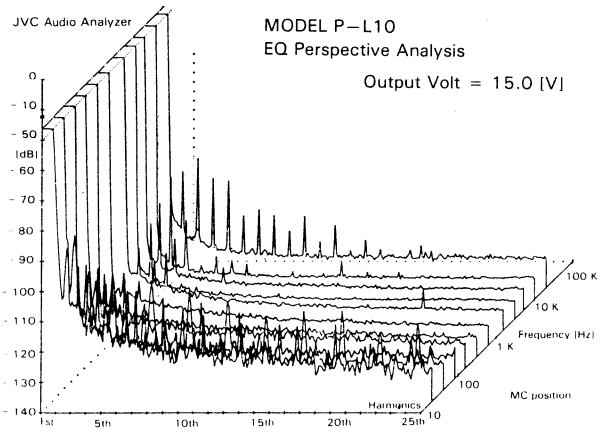


Fig. 21 Example of characteristic in NF high gain equalizer amplifier

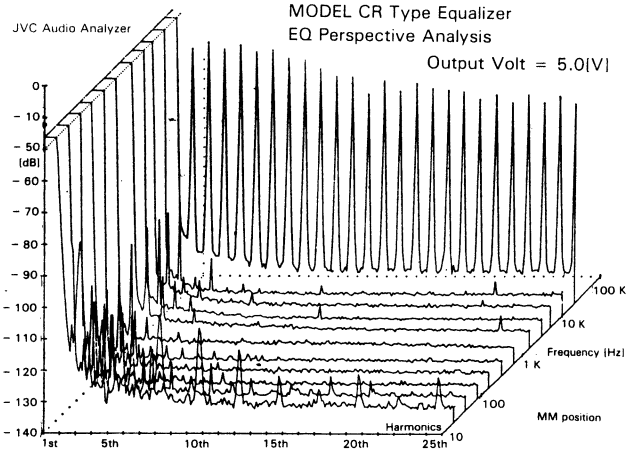


Fig. 13 Example of characteristic in CR type equalizer amplifier

Concretely, the inversion input of the inverter amplifier is imaginarily grounded and the output current of the Gm processor flows all in the RIAA circuit. Thus, the voltage signal whose response is corrected into line with the RIAA curve is taken out of the equalizer output.

Thereupon, let us consider the load effect of the RIAA circuit on the inverter amplifier. Since the inverter amplifier output takes in the current driven by the Gm processor, this current flows according to the RIAA circuit impedance, which is practically limitless.

Therefore, since each stage operates as the NF type by 100% voltage feedback, it has wide dynamic range which features the NF type and good response of flat amplifier which features the CR type.

When changing resistance R_1, the gain is easily varied with little alteration of the circuit operating condition. For this reason, the performance and sound quality do not change at MM or MC position and the response is unconditionally determined by the RIAA circuit, so that it also has a merit that the RIAA deviation becomes automatically flat up to 100 kHz. Fig. 10-13 show the comparision of NF type, CR type and Gm processor system through a perspective analysis.

As described in this paper, the Gm processor which is applied to the volume and equalizer amplifiers can also be applied to wide scope of fields other than the audio field as an superb voltage-current converter as well as a control of the gain and response of amplifiers.

1-6 FT (feed-through) Circuit

The voltage follower amplifier shown in Fig. 16 is a 100% voltage feedback amplifier by the major loop. Here is an outstanding improvement on various characteristics due to NFB. However, since the stability at a closed-loop gain of 0 dB is required, the slew rate lowers when a phase delay compensation circuit is added to apply NFB sufficiently. The FT circuit used in P-L10 enables the compatibility between two antithetic requirements-sufficient NFB and high slew rate.

In conventional NFB amplifiers, for the purpose of stable operation, capacitor C1 is inserted between the output point of the voltage amplifier stage and the AC ground for phase compensation as shown in Fig. 14. However, because of this, the slew rate is restricted and high-frequency characteristic is deteriorated due to the decrease in high-frequency NFB. In the FT circuit used in P-L10, the protection of the high-frequency characteristic from deterioration is made possible keeping the stable operation by driving the phase compensation capacitor by the high speed in-phase buffer amplifier from the input side instead of AC-grounding this capacitor. In Fig. 15 assuming that amplifiers ③ and ④ are sufficiently wide in frequency range as compared with amplifiers ① and ②, the input voltage appearing at output point (A) of amplifier ④ is equal to the output voltage appearing at input point (B) of amplifier ③. Therefore, charge and discharge of capacitor C1 are nullified, which is equivalent to the absence of C1.

Thereby, high-frequency characteristic is greatly improved. (Refer to Photo 1, 2)

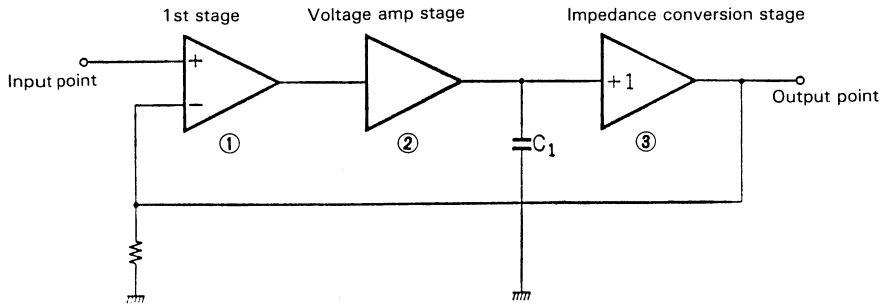


Fig. 14 Example of phase compensation in conventional NFB amplifier

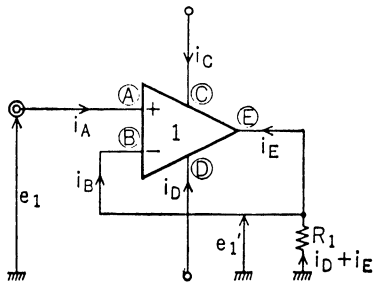


Fig. 16 Fundamental V-I converter circuit in P-L10

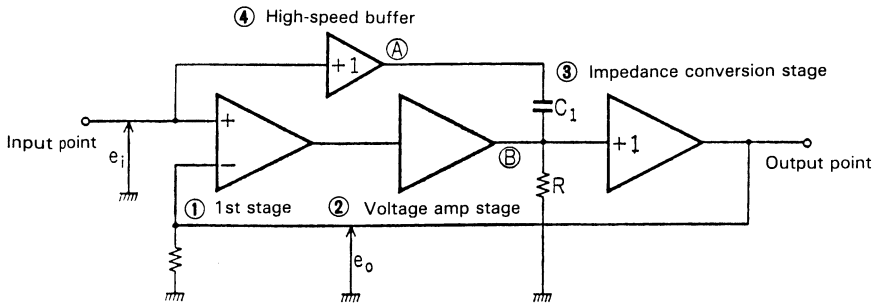


Fig. 15 NFB amplifier with FT circuit in P-L10

The following explains the operating stability of the FT circuit. Assuming that the output of amplifier (2) is of current and the gains of amplifiers (1) and (2) are represneted by gm(s), the circuit equation in Fig. 15 is expressed as follows:

$$(e_i - e_o)gm(s)(R /\!/ \frac{1}{SC_1}) + (e_i - e_o)$$

$$SC_1R = e_o \text{ (povided that } S = j\omega)$$

Here, when $gm(s)(R /\!/ \frac{1}{SC_1}) + SC_1R = A$ and $e_o/e_i = A_v$ this expression is changed as follows:

$$A_v = \frac{A}{1+A}$$

It follows that this expression shows the NFB amplifier characteristic where ß = 1. Concerning the gain characteristic of A, the first term indicates a conventional example of the integrating characteri stic in which the gain lowers as the frequency becomes higher and in which the phase is delayed by $\pi/2 \sim \pi$(rad), whereas the second term indicates the differentiating characteristic in which the phase is advanced by $\pi/2$. This means that stable NFB is possible even at high frequencies.

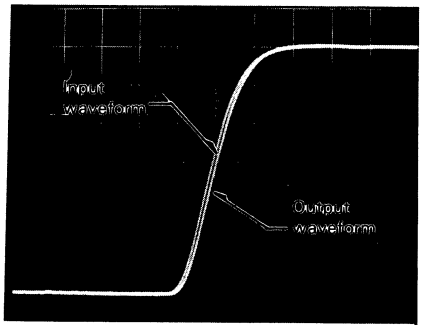


Photo1 NFB amplifier with FT circuit

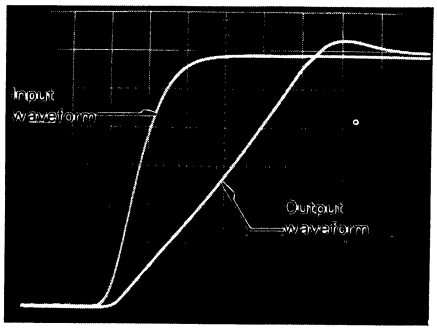


Photo 2 Conventional NFB amplifier without FT circuit

Comparison between new and conventional NFB amplifiers

1-7 Amplifier with Gm Processor

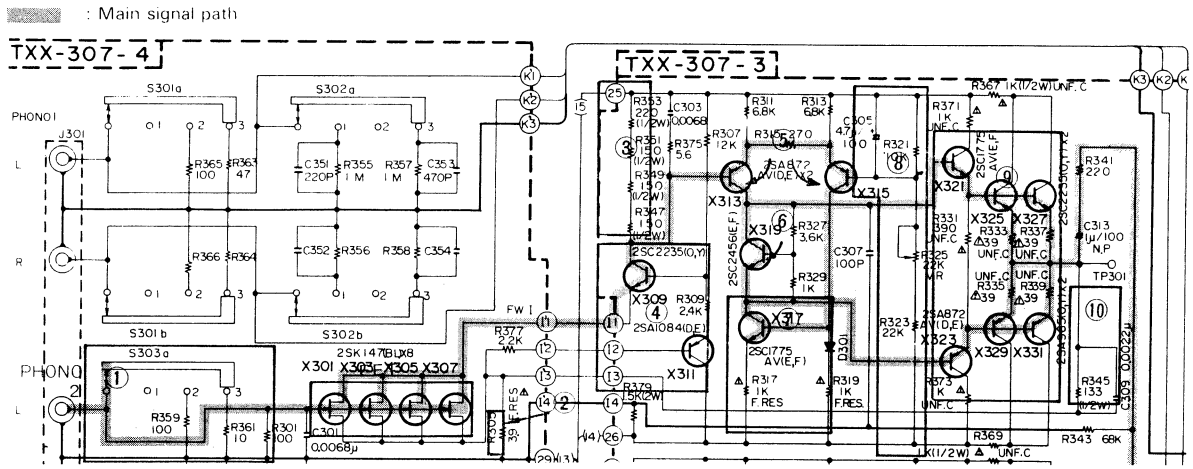
Our new laboratory series preamplifier P-L10 is provided with the volume and equalizer amplifiers each having the Gm processor. Other than these, P-L10 has an ultra high gain equalizer available with an ortofon type cartridge. And this preamplifier is also the control center in which the sound quality and reliability are assured for from parts to pattern. Thus, P-L10 is developed as an authentic preamplifier.
At the same time, new laboratory series main amplifier M-L10 houses our newly developed cascode super A circuit with which the characteristic with the speaker load connected is the same as with the pure resistance load connected.

1-8 Development Concept of Laboratory Series

The audio amplifier is nothing but a device for enjoying music. For this reason, the amplifier must meet so-called "musical sensibility" when considering human senses such as hearing, vision, touch, etc. and besides the area of human heart. Separate amplifiers P-L10 and M-L10 named "laboratory" put much value upon the musical sensibility from such points for from up-to-date technology development to panel design, in which our concept is secretely indicated on the real rosewood-trimmed cabinet to which our traditional wood working technology is applied with the heart of music.
The development concept of laboratory series is just our design concept "Closer to the Musical Truth" towards all over the world.

2. Operation of Each Circuit

2-1 MC Head Amplifier (Exclusive for PHONO 2)



① Input impedance selection circuit
② Feedback circuit
③ Low-noise drain resistor
④ Cascode bootstrap circuit
⑤ Differential amplification
⑥ Bias voltage supply
⑦ Current mirror circuit
⑧ Output offset adjustment circuit
⑨ Final-stage Darlington amplifier circuit
⑩ Feedback circuit

Fig. 17

This is a head amplifier of high gain (voltage gain: 30.9 dB) which permits to use an ORTOFON-type MC cartridge of low output level with high S/N and signal level.

(1) The input impedance selection circuit consisting of S303, R359, and R361 and the first-stage FETs (X301-X307) are mounted on the same board as of the input terminal (J301) so that small output of the MC cartridge comes in directly and is not affected by switches and connectors.

(2) In the first stage, four FETs of high Gm are connected in parallel to obtain high S/N and they perform single operation to raise S/N more. Therefore, adjustment of output offset is made by varying the reference voltage which is generated with R321-325 and C305.

(3) With FETs of high Gm, response tends to deteriorate at high frequencies because of their large feedback capacity. In the P-L10, the cascode bootstrap circuit that consists of X309-311 inproves response mainly at high frequencies.

(4) In an amplifier of high S/N, even noise which the resistor in the feedback loop produces makes a problem. In the P-L10, R305 is as small as 3.9 ohms. X321-331 form the final-stage, parallel push-pull, double Darlington amplifier which drives strongly the feedback circuits (R345 and R305) having such a small resistance.

2-2 Equalizer Amplifier (Voltage gain: 36.5 dB with MM, 58.3 dB with MC (at 1 kHz))

A block diagram of the PL-10's equalizer amplifier is shown below.

Preamplifier:
Raises input impedance with the converter circuit.

F.T. (feed through) circuit:
Bypasses extra-high frequencies to improve response at high speed as well as distortion and dynamic range at high frequencies.

Inverting V-I converter (Gm processor):
Converts input signal voltage to current and inverts phase at the same time.

Inverting I-V converter:
Converts current to voltage and inverts phase at the same time, producing output voltage conforming to RIAA frequency response.

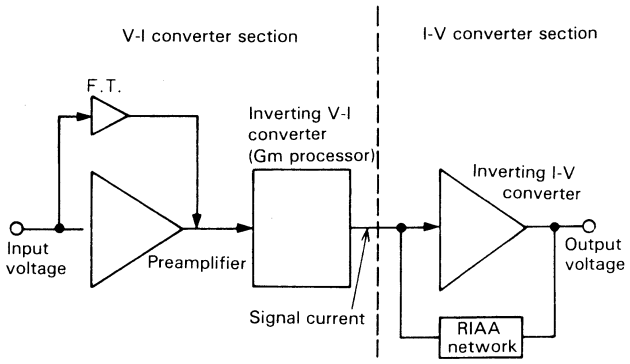
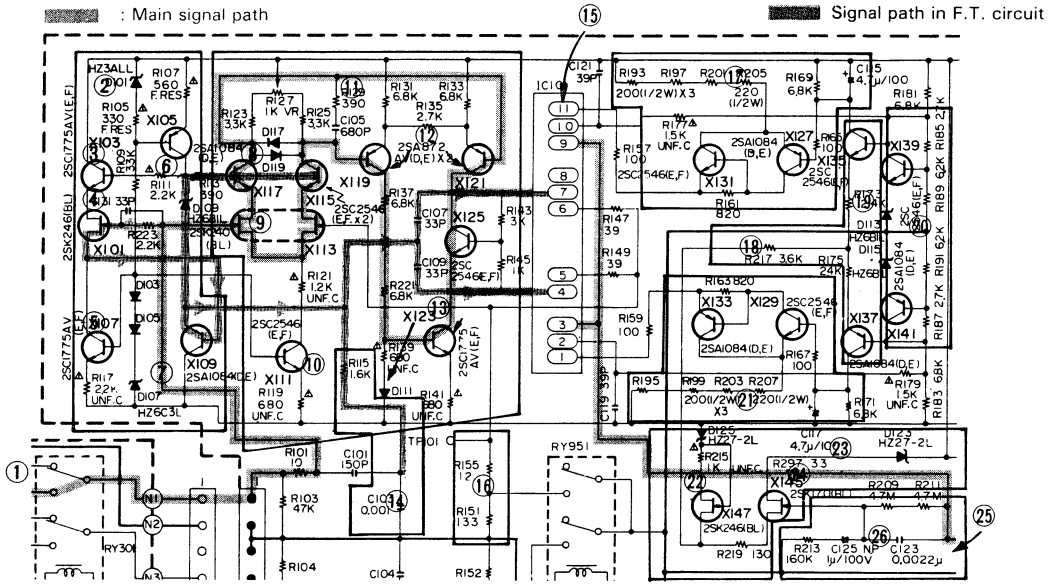


Fig. 18

2-2-(1) V-I Converter Circuit



① Voltage input
② F.T. circuit
③ Cascode
④ Source follower
⑤ Constant current
⑥ Constant current
⑦ Emitter follower
⑧ Cascode
⑨ First differential stage
⑩ Constant current
⑪ Preamplifier
⑫ Differential amplification
⑬ Current mirror
⑭ Input bootstrap circuit
⑮ Gm processor
⑯ Gm resistor
⑰ Low-noise constant current circuit
⑱ DC servo circuit
⑲ Current converter
⑳ Low-noise shunt-type constant voltage circuit
㉑ Low-noise constant current circuit
㉒ Constant current
㉓ DC servo circuit
㉔ Source follower
㉕ Current output
㉖ Phase lag/lead compensation circuit

Fig. 19

The Gm processor converts the signal voltage (cartridge output) input to the F.T. circuit and preamplifier into a current and delivers it to the I-V converter.

<F.T. circuit>

X101-109 form the F.T. circuit. Input signal voltage is converted at high speed into low impedance signal through source follower X101 and emitter follower X109. Only extra-high frequency components pass C107-109 and come directly to pins 7 and 4 of IC101. Output of the F.T. circuit passes R115 and bootstraps input impedance at real time and reduces input capacity.

<Preamplifier>

The preamplifier is a two-stage differential voltage follower which consists of X111-125 and IC101. The first stage combines the differential circuit that comprises low-noise dual FET X113 and constant current source X111 with the cascode bootstrap circuit which comprises X115, X117, and output of the F.T. circuit. This keeps the gate-drain voltage of X113 fixed, thereby improving characteristics mainly at high frequencies. R135 is the current feedback resistor of the second stage. This adjusts open-loop gain at proper level and improves linearity.

<DC servo circuit>

X145, X147, X135, and X137 form the DC servo circuit that keeps DC offset of current output terminals ③ and ⑨ of IC101 at proper level. This circuit varies balance of the low-noise constant current circuit described above.

Frequency response of the P-L10's servo circuit is determined by R169-175, R209-213, R217, R289, C115, C117, C123, C125, and C231. Among these, R209-213, C123, and C125 form a circuit which compensates for delay and advance of phase and determines response at very low frequencies.

The combination of source follower X145, a high-Gm FET, with X147 that performs constant current operation improves open-loop characteristics of the servo circuit and reduces distortion very much at very low frequencies.

D123 and D125 reduce supply voltage to the servo circuit, thereby reducing current leak of X145's gate.

X135 and X137 perform grounded-base operation with the low-noise reference voltage circuit (X139, X141) supplied to convert output of the DC servo circuit to current.

Thus, supply voltage rejection ratio (SVRR) and linearity of the servo circuit are improved.

<Gm processor>

IC101 is named the Gm processor. This includes main part of the voltage-to-current converter. R155 and R151 determine the rate of voltage-to-current conversion.

In the P-L10;

Gm for the MM cartridge is $\frac{1}{12+133} = 6.90$ (m ℧).

Gm for the MC cartridge is $\frac{1}{12} = 83.8$ (m ℧).

<Low-noise constant current circuit>

X127-133 form an extra-low noise constant current circuit of about 30 mA in combination with low-noise resistors R193-207.

X131 and X127 as well as X133 and X129 each of inverted Darlington connection are biased for minimum voltage and current noises.

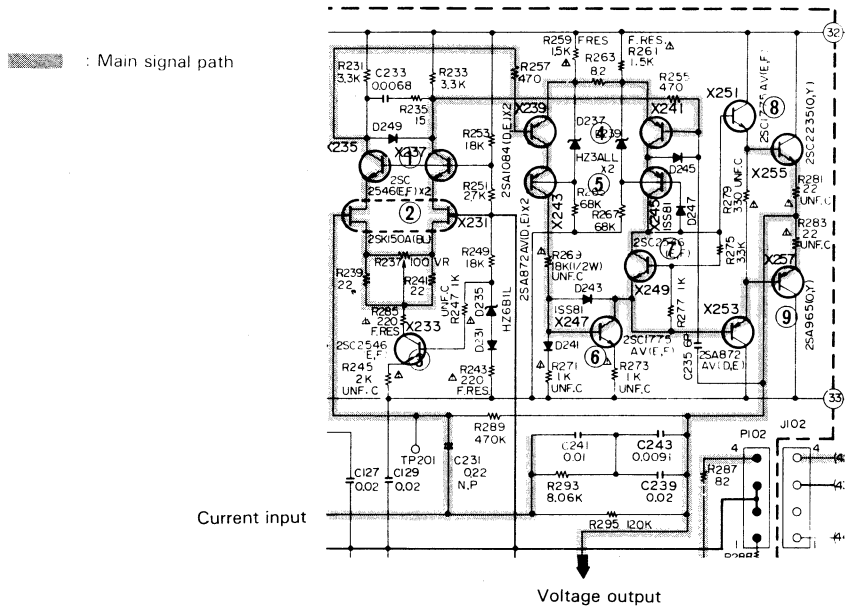
The reference voltage is obtained by supplying current produced by a current servo circuit to R169 and R171. Here C115 and C117 are connected in parallel to reduce voltage noise.

<Low-noise shunt-type constant voltage circuit>

X139 and X141 generate the low-noise reference voltage of about 9.1 V in combination with low-noise zener diodes D113 and D115 (HZ6B1L).

The reference voltage is supplied to pins ② and ⑩ of IC101 and the bases of X135 and X137 and plays an important role to determine the operating point of the V-I converter.

2-2-(2) I-V Converter Circuit



① Cascode
② First differential stage
③ Constant current
④ Differential amplification
⑤ Cascode
⑥ Current mirror
⑦ Bias voltage supply
⑧ Darlington
⑨ Darlington

Fig. 20

This converts the signal current converted by the V-I converter back to voltage while making RIAA compensation by letting the current to flow through the RIAA network composed of R293, R295 and C239-243.

(1) Because this operates with current input, voltage feedback ratio is 100% and excellent characteristics result in the entire frequency range. Common mode inputs are "0" and accurate NFB operation is performed because of inversion.

(2) The first stage uses a cascode-connected low-drift dual FET (X231). Since DC conversion rate of C231 and R289 is 0, output DC offset is very small and it is not necessary to insert a large-capacity capacitor in the equalizer output. In the P-L10, the equalizer output is directly connected with the next stage to improve sound quality.

(3) After voltage amplification by X239 and X241, cascode connection of X243, and X245 improves linearity and response at high frequencies very much.
R255 and C235 compensate for delay by feedback to improve characteristics of the final stage.

(4) The final stage(X251-257) is of Darlington connection to be able to receive the maximum output current (approx. 30 mA) of the V-I converter.

2-3 Volume Amplifier (Voltage gain: 24 dB (MASTER VOLUME MAX))

A block diagram of the P-L10's volume amplifier is shown right. (Fig. 21)

Inverting V-I converter (Gm processor):
Converts input signal voltage to current and inverts phase at the same time.

I-V converter:
Current is converted to voltage in proportion to the resistance of the output side of the variable resistor in reference to the movable tap. The resistance of the output side varies the current-to-voltage conversion ratio and that of the input side varies the voltage-to-current conversion ratio. Since phase is reverse at the input and output ends, signal current does not flow to the movable tap and, therefore, effect of contact resistance is ignorable.

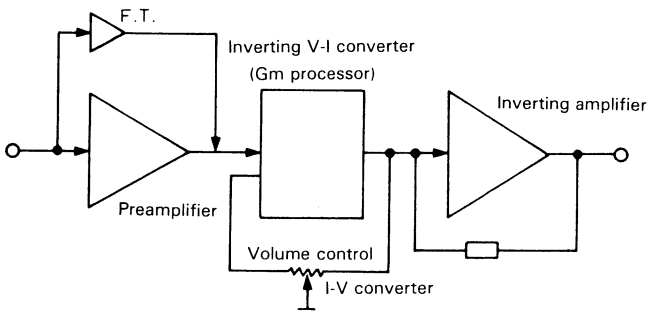
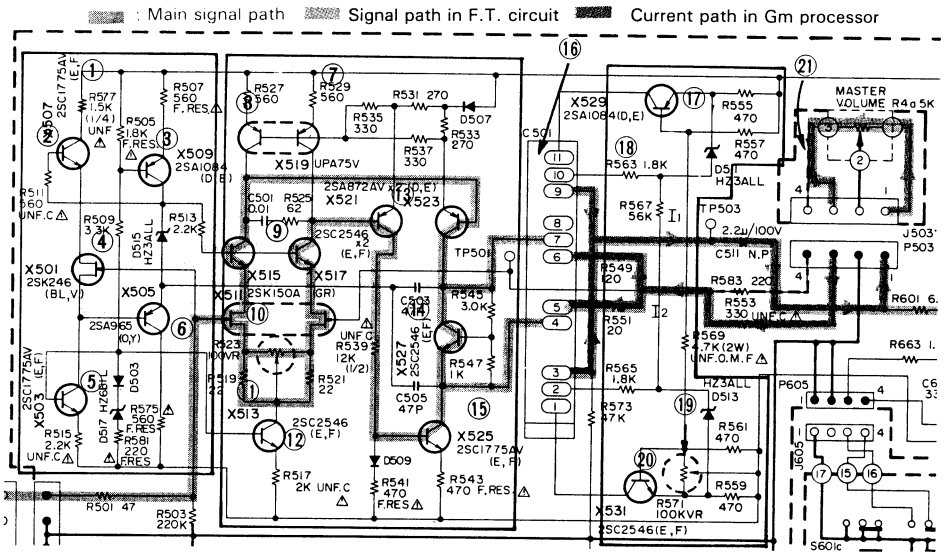


Fig. 21

Inverting amplifier:
Amplifies and inverts phase, and reduces output impedance at the same time.

Volume amplifier



① F.T. circuit
② Cascode
③ Constant current
④ Source follower
⑤ Constant current
⑥ Emitter follower
⑦ Preamplifier
⑧ Active load
⑨ Cascode
⑩ First differential stage
⑪ Offset adjustment VR
⑫ Constant current
⑬ Differential amplification
⑭ Bias power supply
⑮ Current mirror
⑯ Gm processor
⑰ Constant current
⑱ Low-noise constant current circuit
⑲ Offset adjustment VR
⑳ Constant current
㉑ Shield drive

Fig. 22

This is a variable-gain amplifier which amplifies signal with optimum S/N and maximum dynamic range. The volume control varies the current-to-voltage conversion ratio and the voltage-to-current conversion ratio.

<F.T. circuit>

The F.T. circuit consisting of X501-509 works in the same way as the equalizer amplifier.

<Preamplifier>

High resistance to input and low DC drift are required to this preamplifier. The first stage of X515 and X517 drives cascode-connected low-drift dual FET X511 with active load X519. This circuitry raises voltage gain of the first stage and resistance to input at the same time.

<Gm processor>

IC501, named the Gm processor, converts voltage to current. The voltage-to-current conversion ratio is determined by the sum of resistance of R553 (330 ohms) and resistance between ③ and ② of MASTER VOLUME R4a.

The current-to-voltage conversion ratio is determined by the resistance between ② and ③ of MASTER VOLUME R4a.

These conversion ratios vary with the setting of the MASTER VOLUME control and thus optimum dynamic range and S/N are kept.

Deterioration of characteristics is prevented by driving the shield of the shielded wire connected to VOLUME terminal ③. Input signal converted to current by IC101 enters the path shown in the diagram of the preceding page from terminals ③ and ⑨ and comes back to terminals ⑤ and ⑥. Since IC101 operates on principle to keep $I_1 = I_2$, current flowing through the slider of MASTER VOLUME is negligible.

<Low-noise constant current circuit>

X529 and X531 form a low-noise constant current circuit of about 13 mA, in combination with low-noise resistors R555-561. Since allowance for DC offset is comparatively large, the DC servo circuit is eliminated and an offset adjusting circuit consisting of R571 and R573 is added instead.

Inverting Amplifier

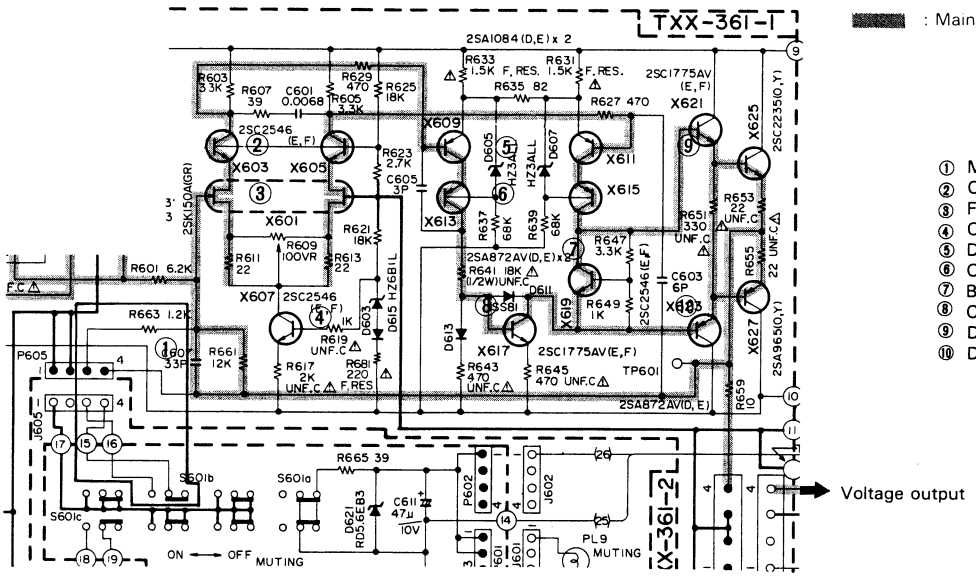


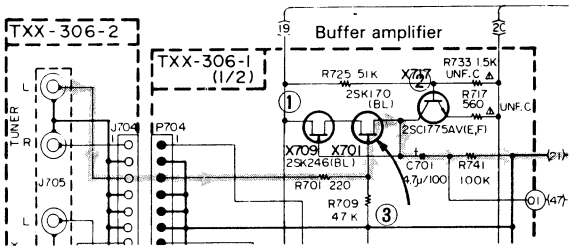
Fig. 23

This inverts and amplifiers the signal amplified by the volume amplifier, and works as an output buffer at the same time.

(1) This is basically the same as the I-V convertor of the equalizer.

(2) In the P-L10, muting is performed by varying the amount of negative feedback. Variation of negative feedback by a bit over 6 dB causes voltage gain to vary by 20 dB, as this is a characteristic of the inverting amplifier.

2-4 Buffer Amplifier (for high-level input lines)



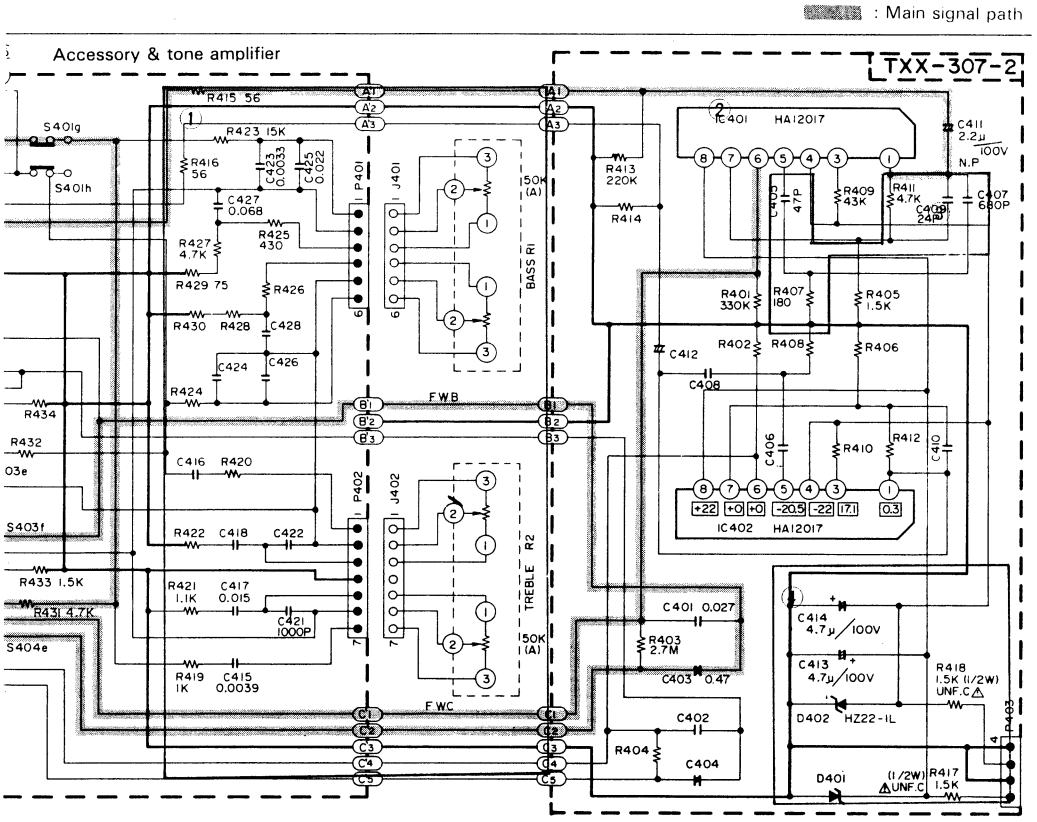
① Cascode
② Constant current
③ Source follower

Fig. 24

To prevent sound leakage and deterioration of crosstalk, the buffer amplifier receives high-level signals of TUNER and AUX, etc., with high input impedance (47 kohms) into the input buffer and sends them out to selector switches, etc., with low output impedance.

FETs X701 and X709 are cascode-connected directly.
Reverse bias of them is made use of.

2-5 Tone Amplifier



① Tone network
② Tone amplifier
③ Phase compensation circuit
④ Shunt type constant voltage circuit

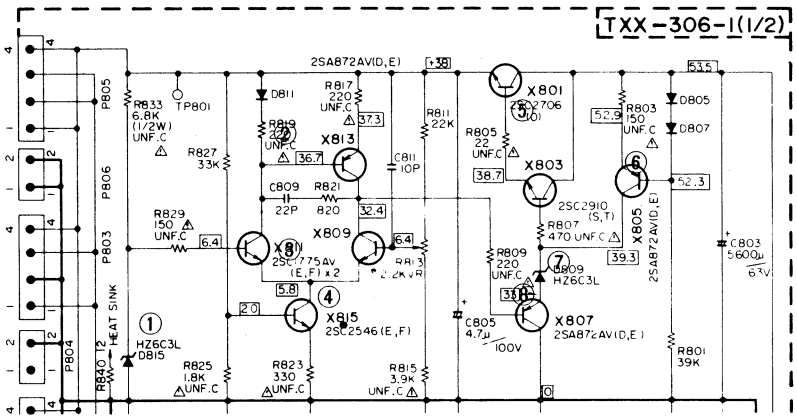
Fig. 25

This is a CR-type tone amplifier which combines an attenuator-type tone network with a flat amplifier for overall gain of 0 dB. This is superior in dynamic characteristics to the NF type.
This circuit is bypassed when the DIRECT swtich is on.

(1) The IC (IC401) used as the flat amplifier is originally designed as an equalizer amplifier. The flat amplifier produces voltage gain of 12.3 dB by 2-pole, 1-lead compensation.

(2) R417, R418, C413, C414, D401 and D402 form a shunt-type constant voltage circuit of ±22 V which supplies ICs with current.

2-6 Regulated Voltage Power Supply



① Reference voltage
② Current mirror
③ Differntial amplification
④ Constant current
⑤ Double Darlington
⑥ Constant current
⑦ Level shift
⑧ Emitter follower

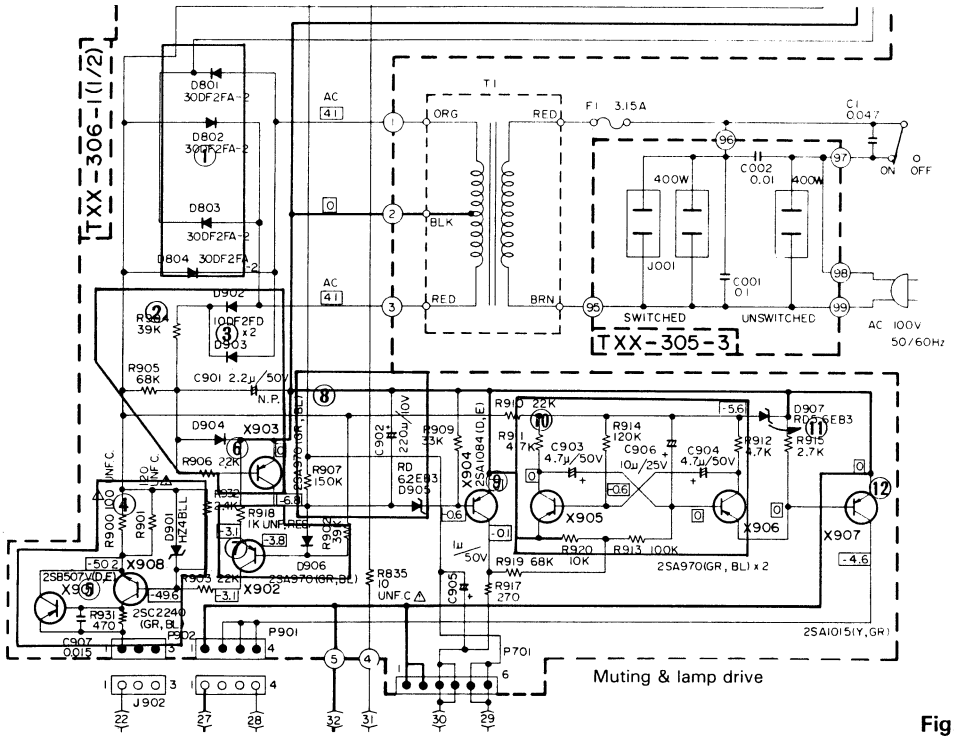
Fig. 26

This is a regulated voltage power supply of ±38 V.

(1) The error amplifier is formed of a current mirror output differential circuit consisting of X809-815.
Output voltage fed back via R811-815 is compared with the reference voltage of D815 and the error, after being amplified, drives double Darlington-connected control transistors X801 and X803 via emitter follower X807.

(2) This power supply supplies all stages with power.

2-7 Muting and Lamp Drive Circuits



① Rectification
② Quick-off circuit
③ Rectification
④ Constant current circuit for indicator lighting
⑤ Inverted Darlington
⑥ Quick-off drive
⑦ Indicator quick-off
⑧ Time constant setting
⑨ Relay drive
⑩ Unstalbe multivibrator for power indicator flickering
⑪ Power supply for unstable multivibrator
⑫ Current amplification

Fig. 27

One is the circuit that controls the output muting relay so that impulsive noises should not go out from the PRE OUT and RECORDING terminals during power-on/off time until the circuits enter stationary state. The other controls the indicator lamps.

(1) Operation is described below separately for two stages as follows.

Ⓐ At power-on time until output muting is released Charging process proceeds after power-on. ±B and regulated power reach stationary state at a relatively early time. At this time, a unstable multivibrator starts to oscillate to let the power indicator to flicker and the other indicators light.

On the other hand, the time constant circuit composed of R907, C902, and D905 causes X904 to turn on with delay when the voltage of C902 which is charged via R907 rises above some 6.8 V (zener voltage of D905 + base-emitter on voltage of X904) and base current begins to flow via D905. When the collector of X904 becomes the ground level, collector current flows and the output relay operates to release muting and deliver signal to the outside. At the same time, the unstable multivibrator that causes the power indicator to flicker stops oscillation with X906 off since its bias which R919 and R920 determine becomes zero. After then the power indicator continues to light.

Ⓑ At power-off time

Immediately after power-off, regulated voltages remain unchanged for a while due to a large time constant of the rectification circuit. During this time, no shock noises appear from the amplifiers. Output muting should, therefore, be applied during this time by a quick-off circuit so that no shock noises should go to outside.

The quick-off circuit composed of R904, R905, C901 and D902-904 is adjusted so that X903 is off when power is on.

When power becomes off, current flowing from R904 becomes zero and X903 turns on with base current flowing via R906 after elapse of the time constant determined by C901 (this is necessary to prevent wrong operation). As a result, charge in C902 decreases rapidly, X904 goes off, and output muting goes on (within 10 msec). At the same time, current flows through D906 and X902 goes off because voltage rises at its base. Thus, current which flows through D901 and R932 to generate a reference voltage for the constant-current circuit of indicators vanishes and all indicators go out immediately after power-off.

2-8 PHONO-Selector Circuit

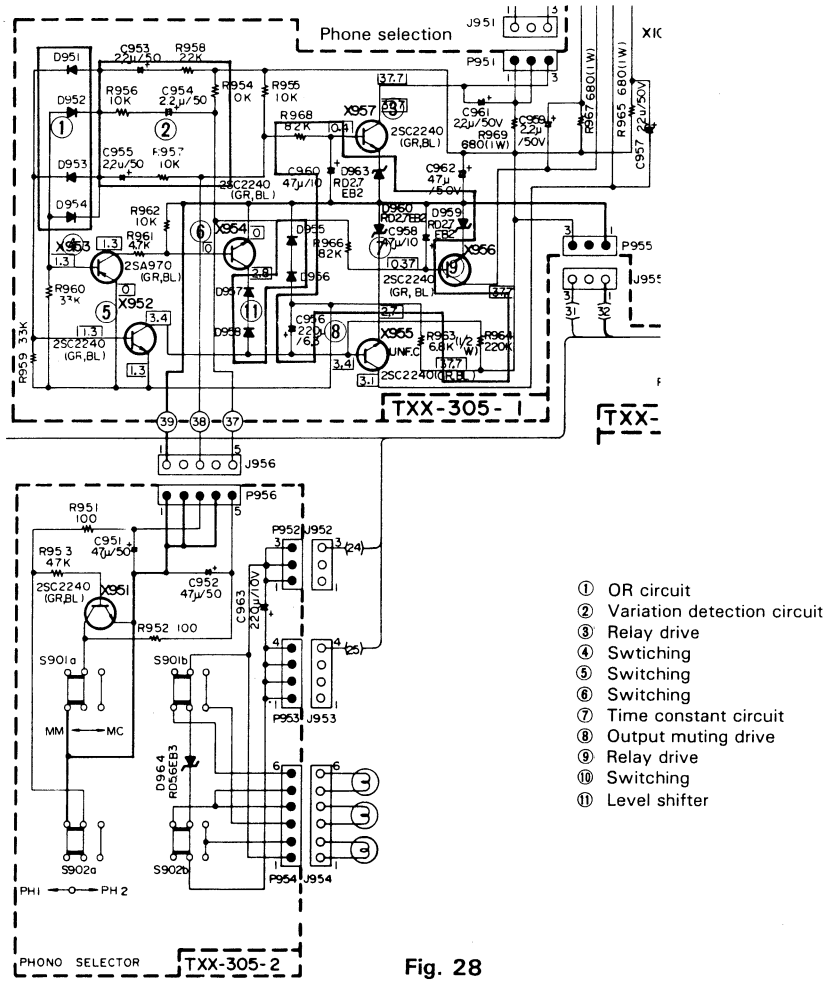


Fig. 28

This includes a circuit which drives relays RY951 and RY301 that select PHONO 1 MM or MC and PHONO 1 or 2 and a circuit which controls timing in such a manner that switching should complete within the output muting time of the equalizer so that switching noises do not come to the outside.

(1) The circuits which are composed of R956-958 and C953-955 detect variation of voltage accompanying operation of the PHONO 1 MM ⟷ MC switch (S901) and the PHONO 1 ⟷ 2 switch (S902). They also detect variation of supply voltages accompanying power-on and off.
Though such voltage variation may be postive or negative, the OR gate composed of D951-954 permits to drive X952-954 in the same manner and, as a result, charge collected in C956 in the stationary state can be decreased rapidly.
When the voltage of C956 falls, X955 turns off and output muting is applied.
On the other hand, variation of voltage accompanying switch operation triggers X956 and X957 to switch with delay of a certain time (0.5-1 second) which is determined by the time constant of R966, R968, C958, C960, and hie (input resistance) of X956 and X957.

As a result, relays RY951 and RY301 operate.
Since the variation detector circuit detects variation of voltage, current is zero after switching operation is completed, and X952-954 are all off.
The voltage of C956 rises as it is charged via R964.
As voltage rises at the base of X955, it turns on with a delay of 4-6 seconds and output muting is released. Thus, signal comes to the outside when the stationary state is entered after completion of switching operation.

3. Guides to Repair

3-1 Precautions for Servicing

For safety

1. When replacing the parts marked with ⚠ , be sure to use the designated parts to ensure safety.
2. If the power cord has been replaced, fit the sub-bracket (glued to the real panel at the inside of the cord stopper) properly and pull the cord in all directions to see that it does not come off.
3. Parts and wires which are related with supply power should be bound and soldered.
4. When soldering terminals of AC line, keep an air clearance of 3 mm or more between any projections of solder and wires.

Concerning parts replacement

1. Two 5,600 μF capacitors are used in the power supply. Charge will not remain in them since all stages of the P-L10 perform class-A operation. However, keep away from the B-lines for 10 seconds after power-off.
2. When replacing a part, use the same kind of part as the original one used in the P-L10 even if it is not a safety-critical part. This is necessary to keep initial performance and for safety.
3. To repair scratches or slight depressions of the cabinet, refer to the 3-5 How to clean and Repair the Cabinet at page 24.
4. Be sure to check the primary fuse after service. If it is deteriorated due to overcurrent, replace it with a new one.

Adjustment of the sub-door

Adjust operation of the sub-door with the screw provided beneath the door. There is an adjustment round hole at the front bottom of the cabinet. Make adjustment with a screwdriver as follows.
When the door is closed, tighten the adjusting screw somewhat hard in such a manner that some gap develops at the top of the door due to force of the knock/pop pin when the top of the door is pressed. Then, loosen the adjusting screw gradually. The door will open little by little. When the knock pin is fully extended, the door does not open any more with a click. At this time, stop loosening the screw.

3-2 Checking Characteristics after Repair

Be sure to check the following items after power-on.

3-2-(1) Check at Test Points and Readjustment

Adjustment item and board	Connection point (Test Point No.)	Adjustment point (Test Point No.)	Setting voltage	Remarks
○ Supply voltage Power supply P.C. board (TXX-306-1)	TP801-Tab 2 TP802- 〃	R 813 R 814	+38±0.1 V −38±0.1 V	Tab 2: Transformer's black lead is connected
○ DC balance Volume amplifier P.C. board (TXX-361-1)	TP501-TP603 TP502- 〃 TP503- 〃 TP504- 〃 TP601- 〃 TP602- 〃	R 523 R 524 R 571 R 572 R 609 R 610	0±0.1 mV 〃 0±100 mV 〃 0±0.1 mV 〃	} MASTER VOLUME: minimum Input: TUNER Input: shorted
○ DC balance Equalizer amplifier P.C. board (TXX-305-1)	TP101-TP103 TP102- 〃 TP201- 〃 TP202- 〃	R 127 R 128 R 237 R 238	0±0.1 mV 〃 〃 〃	Input: PHONO 1 Input: shorted
○ DC balance Head amplifier P.C. board (TXX-307-3)	TP301-TP103 TP302- 〃	R 325 R 326	−400±50 mV	} Adjust in 1 ~ 2 minutes after power-on

Note: At TP503 and TP504, adjust voltage to 0 ± 100 mV.
It is enough that the voltage is 0 ± 500 mV in stationary state.

Precautions for measurement

1. To prevent undesirable oscillation, connect a 1-kohm resistor in series with the probe of the measuring instrument.
2. Use a measuring instrument which can measure voltage less than 100 μV accurately (for example, HP 3465B digital multimeter).

3-2-(2) Checking Voltage Gain and S/N

If something related with voltage gain or S/N has been serviced, be sure to check the following items. In other cases, this is not necessary.

If an S/N meter is not available, listen and compare with a proper channel.

Circuit		Input terminal	Output terminal	Voltage gain (dB)		Hum and noise Compensate according to IHF-A	Remark
Equalizer amplifier	PHONO 1 (MM)	PHONO L	REC 1	20 Hz	54.8±0.5	Less than 8.5 μV or −101.5 dBV	MASTER VOLUME at MIN
				1 kHz	35.5±0.5		
				20 kHz	15.9±0.5		
	PHONO 1 (MC)	PHONO 1	REC 1	20 Hz	76.9±0.5	Less than 63.3 μV or −84.0 dBV	MASTER VOLUME at MIN
				1 kHz	57.6±0.5		
				20 kHz	37.9±0.5		
	PHONO 2 (MC)	PHONO 2	REC 1	20 Hz	85.7±0.5	Less than 66.7 μV or −83.5 dBV	MASTER VOLUME at MIN
				1 kHz	66.4±0.5		
				20 kHz	46.7±0.5		
Volume amplifier		TUNER	PREOUT 1	20 Hz	22.4±2	Less than 14.2 μV or −97 dBV	MASTER VOLUME at MAX DIRECT switch ON
				1 kHz	22.4±2		
				20 kHz	22.4±2		

Note: 1.0 dBV = 1.0 V

Precautions for Measurement

1. Measure voltage gain at the output level of 0 dBm (0.775 V). Pay attention to hum which may be induced when making measurement for a circuit whose gain is high.
2. Keep the input shorted when measuring hum and noise. Use an S/N meter which is provided with an IHF A network of high sensitivity. Monitoring its output with an oscilloscope, check that measurement is free from induced hum.

3-3 How to Locate a Defective Section

A Block Diagram of the P-L10.

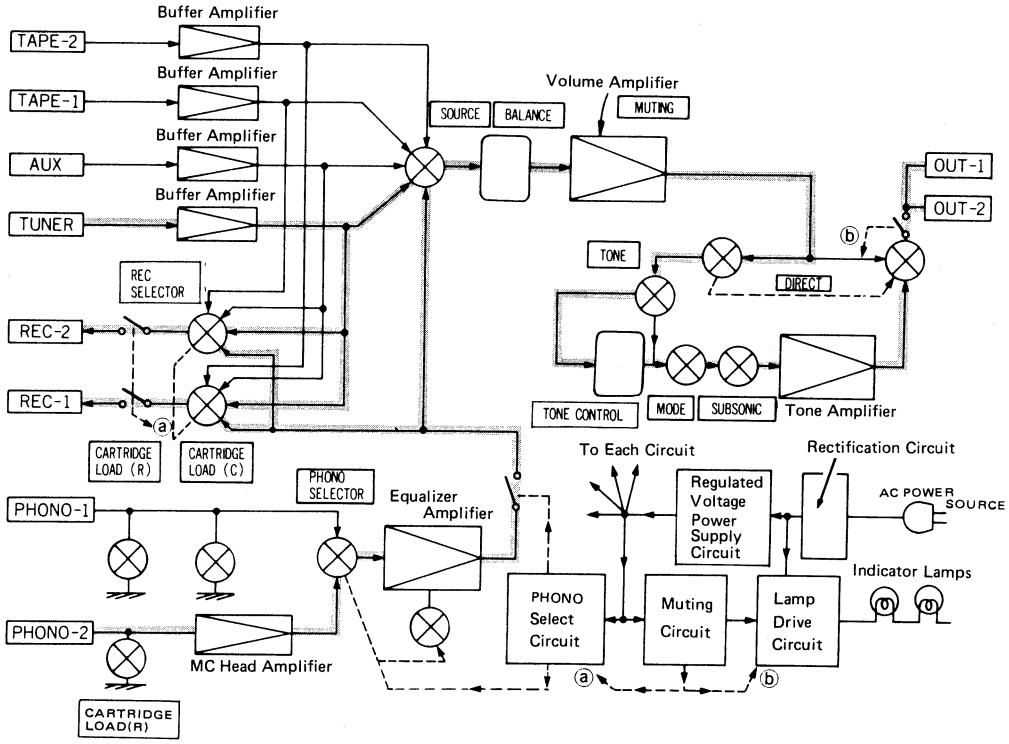


Fig. 29 indicates a path of signal.

As shown above, the P-L10's signal paths include the equalizer section which includes the MC head amplifier; the flat amplifier section which includes the buffer amplifiers, tone amplifier, and volume amplifier; and switches which select a combination of these amplifiers. Therefore, we can locate a defective section by operating the source selector switch and balance control and by changing terminals where signals are applied. Two flowcharts of troubleshooting are given for the symptom that no sounds come out. For other symptoms, we may follow a similar procedure. We do not describe checking methods here because the circuits except the V-I converter of the equalizer amplifier and the volume amplifier are common ones and repair may be made in the same way as for existing amplifiers.

Symptom-A

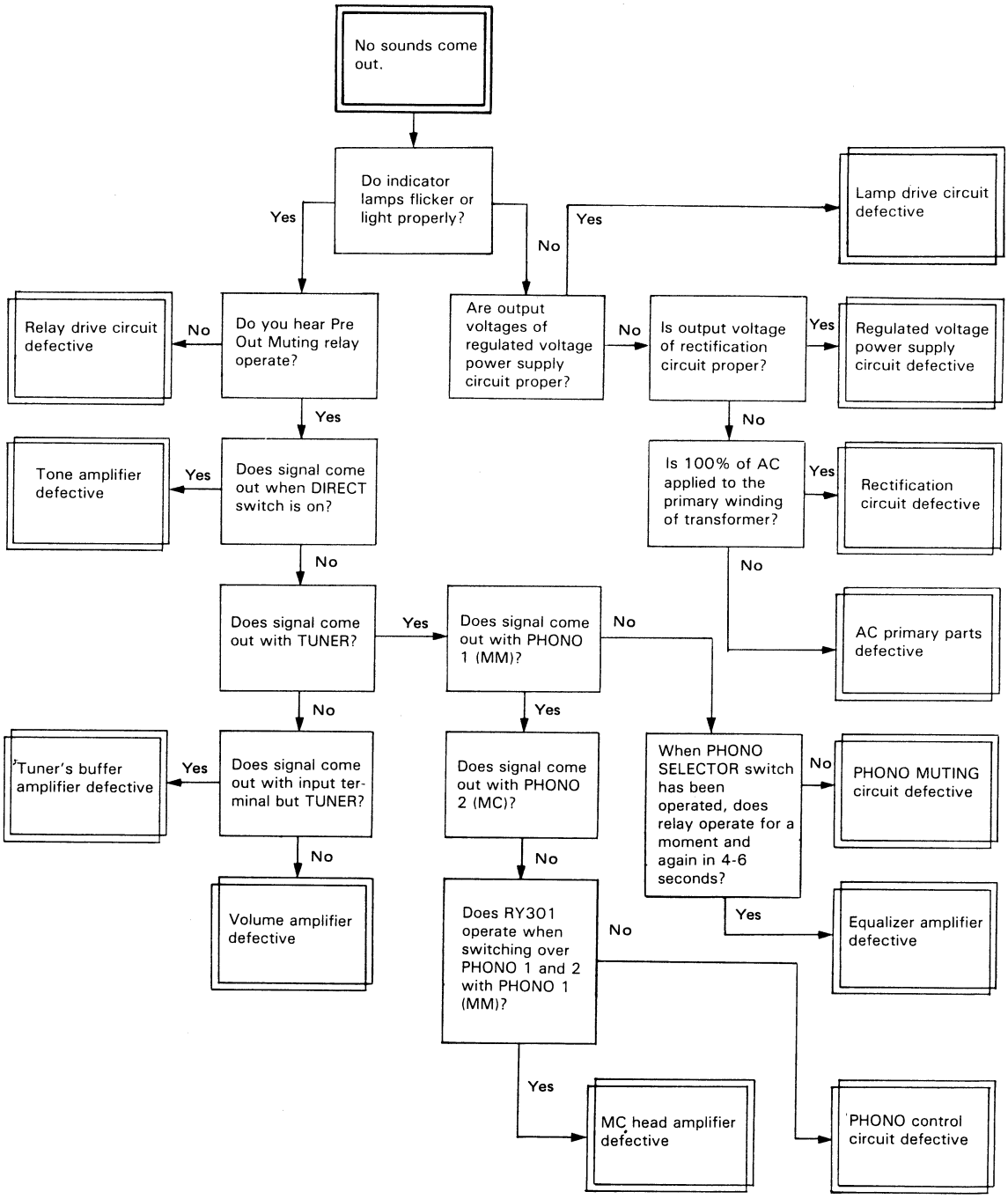


Fig. 30-A

Symptom-B

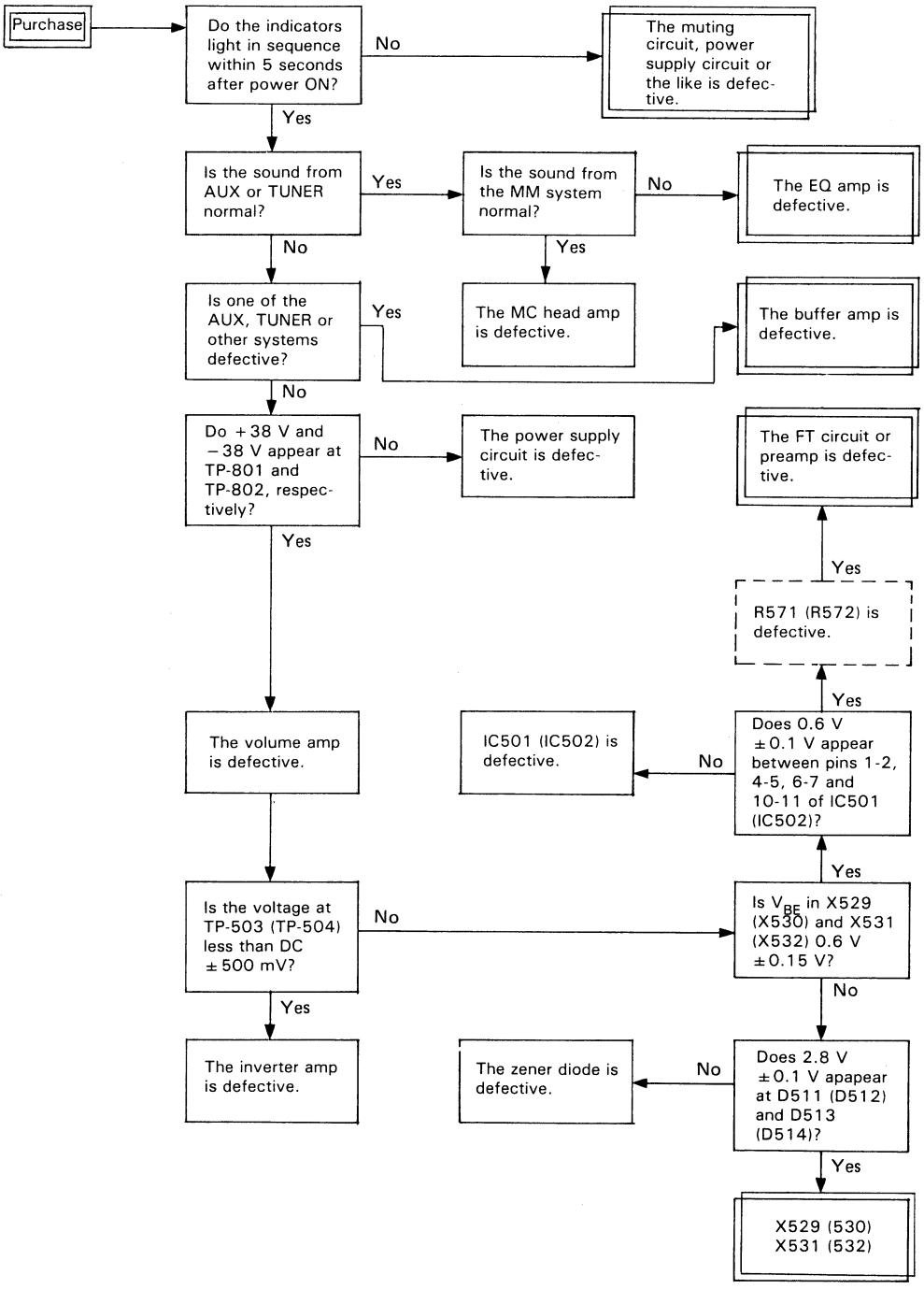

Purchase
Do the indicators light in sequence within 5 seconds after power ON?
No
The muting circuit, power supply circuit or the like is defective.
Yes
Is the sound from AUX or TUNER normal?
Yes
Is the sound from the MM system normal?
No
The EQ amp is defective.
No
Yes
Is one of the AUX, TUNER or other systems defective?
Yes
The MC head amp is defective.
The buffer amp is defective.
No
Do +38 V and −38 V appear at TP-801 and TP-802, respectively?
No
The power supply circuit is defective.
The FT circuit or preamp is defective.
Yes
Yes
R571 (R572) is defective.
Yes
The volume amp is defective.
IC501 (IC502) is defective.
No
Does 0.6 V ±0.1 V appear between pins 1-2, 4-5, 6-7 and 10-11 of IC501 (IC502)?
Yes
Is the voltage at TP-503 (TP-504) less than DC ±500 mV?
No
Is V_{BE} in X529 (X530) and X531 (X532) 0.6 V ±0.15 V?
No
Yes
The inverter amp is defective.
The zener diode is defective.
No
Does 2.8 V ±0.1 V apapear at D511 (D512) and D513 (D514)?
Yes
X529 (530) X531 (532)

Fig. 30-B

3-4 How to Check the Equalizer and Volume Amplifiers

1) Equalizer amplifier
The equalizer amplifier may be divided into the V-I converter and the I-V converter as described before.

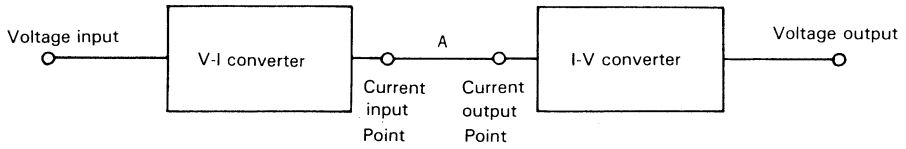


Fig. 31

No signal voltage develops at point A during normal operation. Check this point for any voltage. This will help you find a defect.

1. When signal voltage develops
   The I-V converter may be defective.
   Hints: [1] Is every transistor biased properly?
   [2] Isn't C231 open?
2. When DC offset voltage of more than ±2 V develops
   Ground pins ④ and ⑦ of IC101 and check voltage at point A. If DC offset decreases, the preamplifier or F.T. circuit may be defective.
   If DC offset does not vary, IC101, low-noise current circuit, or DC servo circuit may be defective.
   Hints: [1] Check voltage across ① - ②, ④ - ⑤, ⑥ - ⑦, and ⑩ - ⑪. Is it 0.6 ±0.1 V?
   [2] Are collector voltages of X139 and X141 respectively 9.1 ±0.1 V and −9.1 ±0.1 V?
   [3] Is every transistor biased properly?
   [4] Does voltagbe vary at T.P.101 when R127 is operated?
   Ground the input gate of X113 and check voltage at T.P.101 because the F.T. circuit is defective. Separate the F.T. circuit and preamplifier at this point and check each separately.
3. The V-I converter is mostly good if voltage gain is 0±1 dB in between the PHONO-1 input and this output end, with the output of the V-I converter grounded via 150 ohms and MM selected.

2) Volume amplifier
Hints:
[1] Is MASTER VOLUME properly wired?
The wiring may be defective if two channels are not balanced well in gain and other characteristics (when operation is good except for this defect).
[2] Ground pins ④ and ⑦ of IC501 and operate R571.
Does voltage across ③ and ⑨ vary?
If it remains unchanged, IC501 or the low-noise constant current circuit may be defective.
[3] Does voltage vary at T.P.501 when R523 is operated?
Ground the connection point of X501 and X511 and check voltage at T.P.501. If voltage varies, offset voltage is likely to develop at T.P.501 because the F.T. circuit is defective. Separate the F.T. circuit and preamplifier at this point and check each separately.

Design made with importance attached to reliability and sound quality
Reliability is raised by the use of nitrogen-sealed relays, metal film resistors, switches with silver-clad contacts, and so on. Consideration is also given to sound quality, from parts such as the newly developed, plane foil (etching type) electrolytic capacitors, low-noise zener diodes, and high-speed diodes to the design of circuit pattern.

3-5 How to Clean and Repair the Cabinet

3-5-(1) How to Clean

To clean the cabinet, soak a piece of dry, soft cloth with a liquid wax (silicon wax) available in markets, wipe the cabinet thoroughly, and finish with dry cloth evenly.

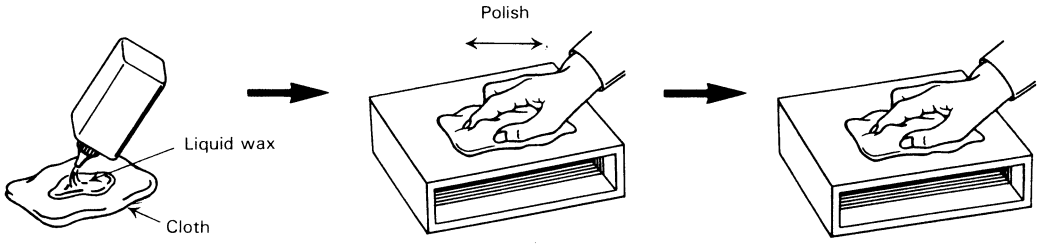


Fig. 32

3-5-(2) How to Repair

<Slight scratches>

Grind the scratched part with water-resisting sand-paper of #800-1000 with the aid of water until scratches are removed. Apply rubbing compound (made by Roido kagaku) to cloth and polish the surface with considerable force until the traces of sand-paper disappear and the surface becomes lustrous. Apply silicone wax to cloth and wipe the surface with it finally.

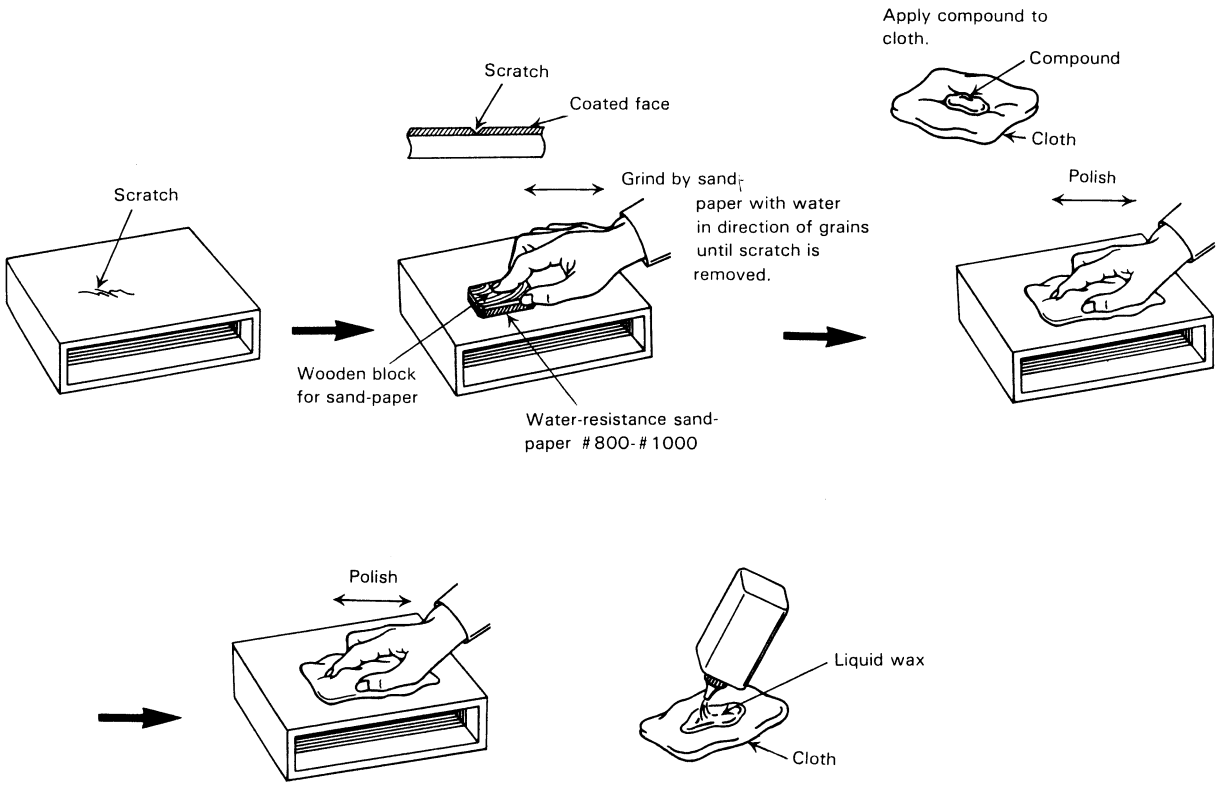


Fig. 33

< Serious scratches >

Coat a scratched part with lacquer enamel two to three times in such a manner that the color is first lighter than at the surrounding part and then color becomes deeper. Apply thick transparent lacquer thickly to the part with the tip of a thin brush. When it has dried up (it takes about 8 hours), grind with water-resisting sandpaper of #800-1000 using water. When the surface has become level, polish it with rubbing compound until traces of sandpaper disappear and the surface becomes lustrous. Apply silicone wax to cloth and wipe the surface with it finally.

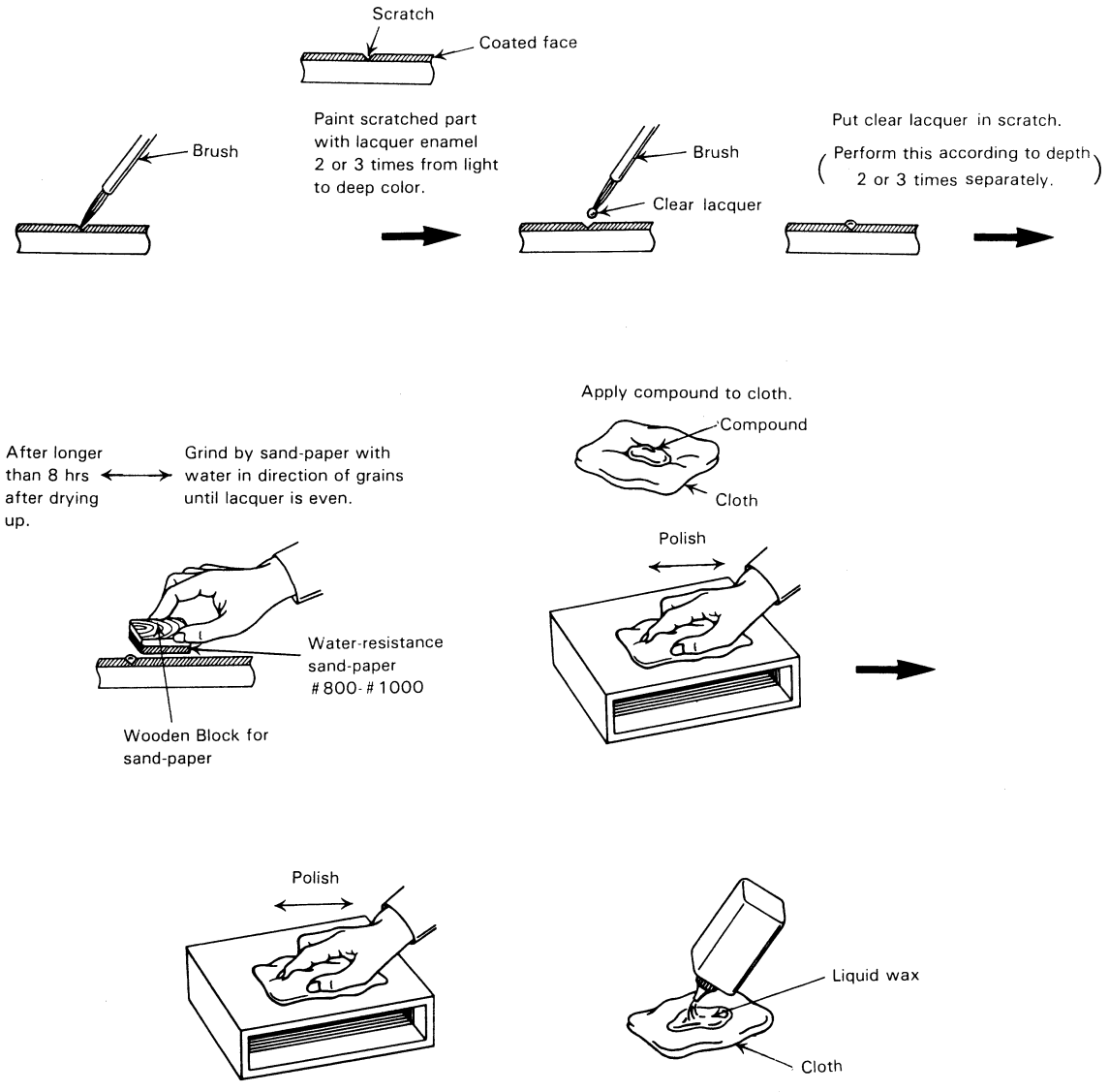

Scratch
Coated face
Brush
Paint scratched part with lacquer enamel 2 or 3 times from light to deep color.
Brush
Clear lacquer
Put clear lacquer in scratch.
(Perform this according to depth 2 or 3 times separately.)
After longer than 8 hrs ←→ after drying up.
Grind by sand-paper with water in direction of grains until lacquer is even.
Water-resistance sand-paper #800-#1000
Wooden Block for sand-paper
Apply compound to cloth.
Compound
Cloth
Polish
Polish
Liquid wax
Cloth

Fig. 34

<Contusion>

Put an annealed lac in the contusion, then write grains with lacquer enamel of the same color as the surrounding grains in such a manner that the color is first lighter and then deeper. Spray it with transparent lacquer two or three times. When it has dried up, grind with water-resisting sandpaper of #800-1000 using water. When the surface has become level, polish it with rubbing compound until the traces of sandpaper disappear and the surface becomes lustrous. Apply silicone wax to cloth and wipe the surface with it finally.

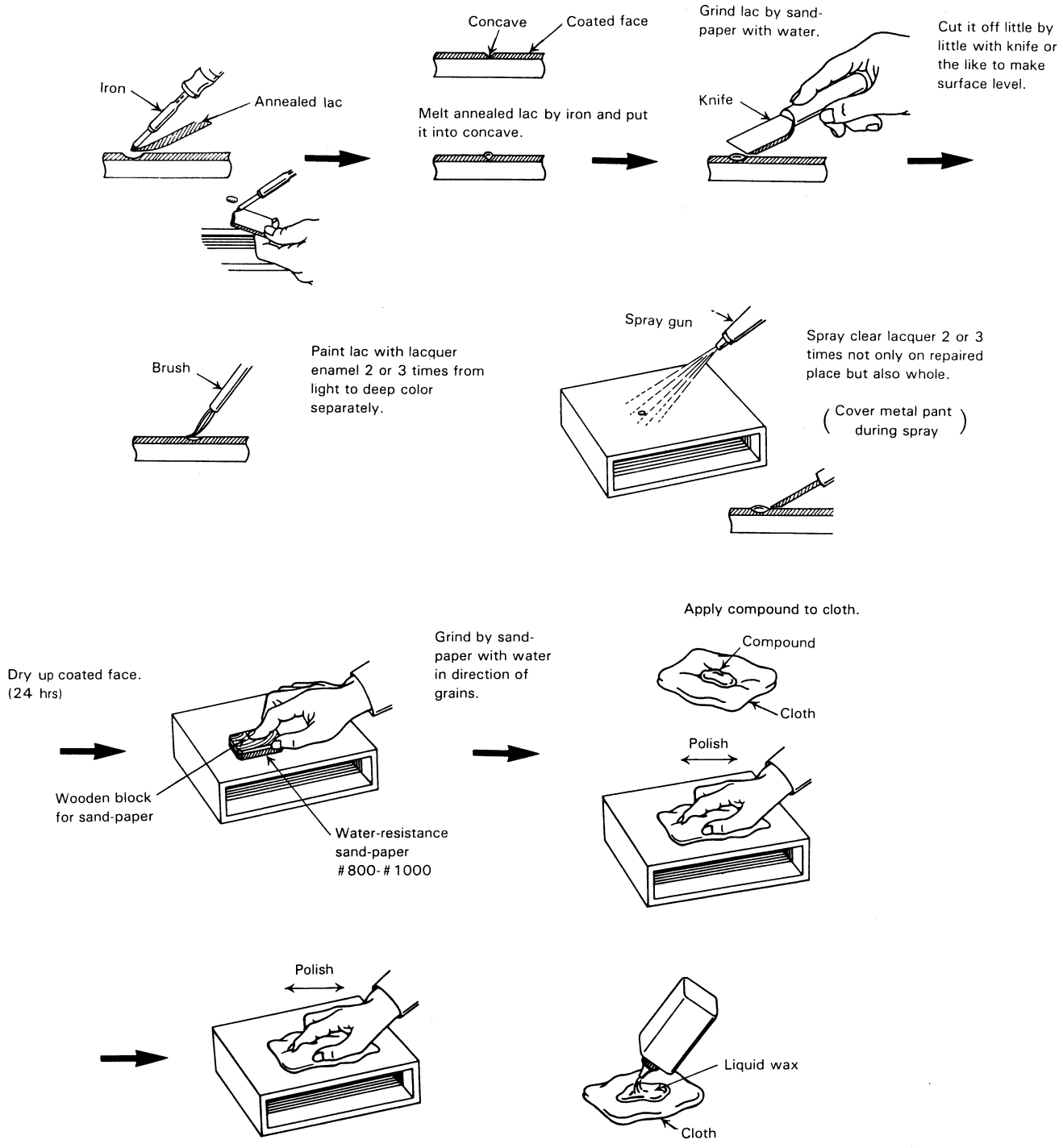

Iron
Annealed lac
Concave
Coated face
Melt annealed lac by iron and put it into concave.
Grind lac by sand-paper with water.
Knife
Cut it off little by little with knife or the like to make surface level.
Brush
Paint lac with lacquer enamel 2 or 3 times from light to deep color separately.
Spray gun
Spray clear lacquer 2 or 3 times not only on repaired place but also whole.
(Cover metal pant during spray)
Dry up coated face. (24 hrs)
Wooden block for sand-paper
Water-resistance sand-paper #800-#1000
Grind by sand-paper with water in direction of grains.
Apply compound to cloth.
Compound
Cloth
Polish
Polish
Liquid wax
Cloth

Fig. 35

<Discolored edge>

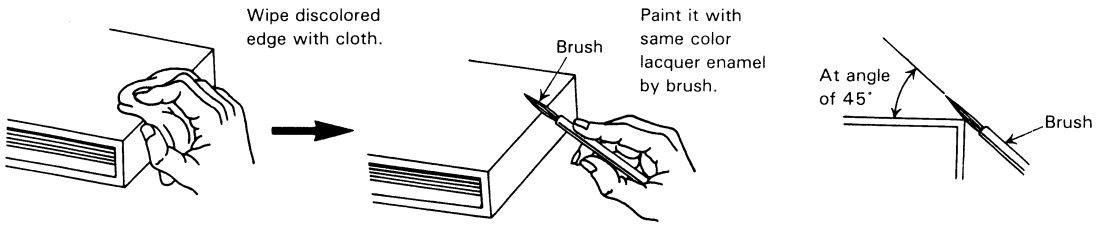


Fig. 36

JVC

VICTOR COMPANY OF JAPAN, LIMITED, TOKYO, JAPAN

Printed in Jap
5805 (O)

P-L10

SERVICE MANUAL

Contents

1. Service Precautions
   1-(1) For safety
   1-(2) Concerning parts replacement
2. Adjustment Procedures
   2-(1) Adjustment of the Sub-door
   2-(2) Check at test points and adjustment
   2-(3) Checking voltage gain and S/N
3. Disassembly
   3-(1) Removal Procedures of Cabinet
   3-(2) Removal Procedures of Source Selector P.C. Board Ass'y
   3-(3) Removal Procedures of Power Switch Shaft
4. Connection Diagram

Schematic Diagram & Block Diagram

1. Service Precautions

1-(1) For safety

1. When replacing the parts marked with ⚠ , be sure to use the designated parts to ensure safety.
2. If the power cord has been replaced, fit the subbracket (glued to the real panel at the inside of the cord stopper) properly and pull the cord in all directions to see that it does not come off.
3. Parts and wires which are related with supply power should be bound and soldered.

1-(2) Concerning parts replacement

1. Two 5,600 μF capacitors are used in the power supply. Charge will not remain in them since all stages of the P-L10 perform class-A operation.
   However, keep away from the B-lines for 10 seconds after power-off.
2. Be sure to check the primary fuse after service.
   If it is deteriorated due to overcurrent, replace it with a new one.

2. Adjustment Procedures

2-(1) Adjustment of the Sub-door

Adjust operation of the sub-door with the screw provided beneath the door. There is an adjustment round hole at the front bottom of the cabinet. Make adjustment with a screwdriver as follows.
When the door is closed, tighten the adjusting screw somewhat hard in such a manner that some gap develops at the top of the door due to force of the knock pin when the top of the door is pressed. Then, loosen the adjusting screw gradually. The door will open little by little. When the knock pin is fully extended, the door does not open any more with a click. At this time, stop loosening the screw.

2-(2) Check at test points and adjustment

Adjustment item and P.C. board	Connection point (Test point No.)	Adjustment point (Adjustment Volume No.)	Setting voltage	Remarks
Supply voltage Power supply P.C. Board (TXX-306-1)	TP801-Tab ② TP802- "	R813 R814	+38 ± 0.1 V -38 ± 0.1 V	Tan ② : Transformer's black lead is connected
DC balance Volume amplifier P.C. board (TXX-361-1)	TP501-TP603 TP502- " TP503- " TP504- " TP601- " TP602- "	R523 R524 R571 R572 R609 R610	0 ± 0.1 mV " 0 ± 100 mV " 0 ± 0.1 mV "	MASTER VOLUME: minimum Input : TUNER Input : shorted
DC balance Equalizer amplifier P.C. board (TXX-305-1)	TP101-TP103 TP102- " TP201- " TP202- "	R127 R128 R237 R238	0 ± 0.1 mV " " "	Input : PHONO 1 Input : shorted
DC balance Head amplifier P.C. board (TXX-307-3)	TP301-TP103 TP302- "	R325 R326	-400 ± 50 mV	Adjust in 1 ~ 2 minutes after power-on

Note : At TP503 and TP504, adjust voltage to 0 ± 100 mV. It is enough that the voltage is 0 ± 500 mV in stationary state.

Precautions for measurement

1. To prevent undesirable oscillation, connect a 1-kohm resistor in series with the probe of the measuring instrument.
2. Use a measuring instrument which can measure voltage less than 100 μV accurately.

2-(3) Checking voltage gain and S/N

If something related with voltage gain or S/N has been serviced, be sure to check the following items. In other cases, this is not necessary. If an S/N meter is not available, listen and compare with a proper channel.

Circuit		Input terminal	Output terminal	Voltage gain (dB)		Hum and noise Compensate according to IHF-A	Remark
Equalizer amplifier	PHONO 1 (MM)	PHONO 1	REC 1	20 Hz	54.8 ± 0.5	Less than 8.5 μV or -101.5 dBV	MASTER VOLUME at MIN.
				1 kHz	35.5 ± 0.5		
				20 kHz	15.9 ± 0.5		
	PHONO 1 (MC)	PHONO 1	REC 1	20 Hz	76.9 ± 0.5	Less than 63.3 μV or -84.0 dBV	MASTER VOLUME at MIN.
				1 kHz	57.6 ± 0.5		
				20 kHz	37.9 ± 0.5		
	PHONO 2 (MC)	PHONO 2	REC 1	20 Hz	85.6 ± 1	Less than 66.7 μV or - 83.5 dBV	MASTER VOLUME at MIN.
				1 kHz	66.4 ± 1		
				20 kHz	46.7 ± 1		
Volume amplifier		TUNER	PREOUT 1	20 Hz	22.4 ± 2	Less than 14.2 μV or -97 dBV	MASTER VOLUME at MAX. DIRECT switch ON
				1 kHz	22.4 ± 2		
				20 kHz	22.4 ± 2		

Note : 0 dBV = 1.0 V

Precautions for measurement

1. Measure voltage gain at the output level of 0 dBm (0.775 V). Pay attention to hum which may be induced when making measurement for a circuit whose gain is high.
2. Keep the input shorted when measuring hum and noise. Use an S/N meter which is provided with an IHF A network of high sensitivity. Monitoring its output with an oscilloscope, check that measurement is free from induced hum.

3. Disassembly

3-(1) Removal Procedures of Cabinet

Note: In this work, it is recommended that a soft cloth be put on the working table to avoid damage to the cabinet.

1. Turn the unit over as shown in **Fig. 1**, and remove the four screws near the feet.
2. Turn the surface of the unit upward as shown in **Fig. 2**, and take out the chassis.

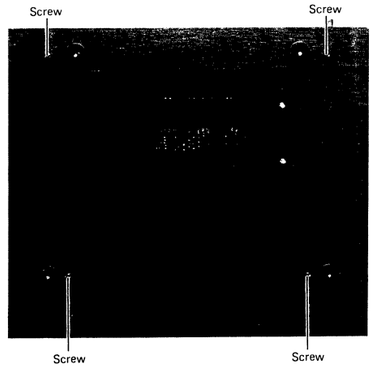


Fig. 1

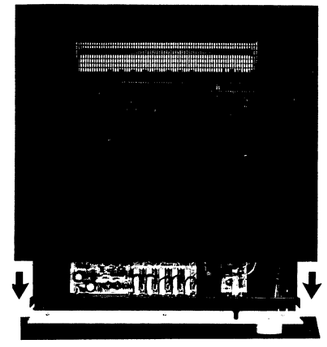


Fig. 2

3-(2) Removal Procedures of Source Selector P.C. Board Ass'y

1. Remove the cabinet and remove the front panel.
2. Remove the lamp sockets.
3. Remove six screws ① – ⑥ of the front bracket, and pull out the front bracket forward by 3 to 4 cm.
4. Remove two screws ⑦ and ⑧ of the push switches and screw ⑨
5. Remove the board fasteners and take up the board.

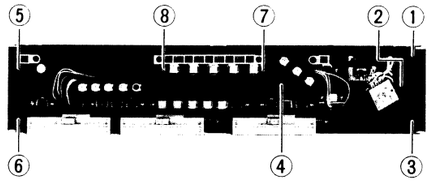


Fig. 3

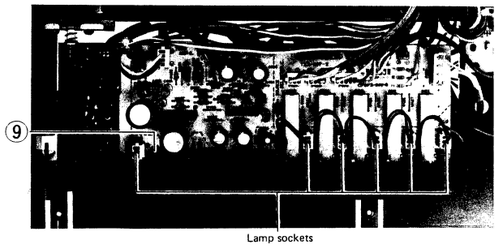


Fig. 4

3-(3) Removal Procedures of Power Switch Shaft

1. Remove the screws securing the shaft to the switch bracket, and hold the switch up.
2. Put a screwdriver to the cut-out section of the shaft, open the fitting section of the shaft and take out the shaft.

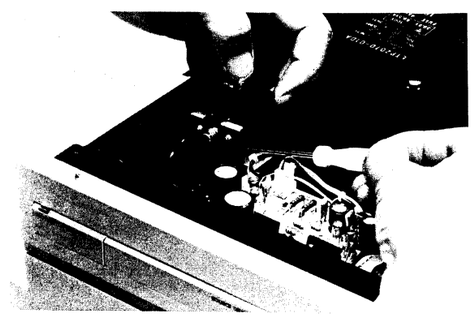
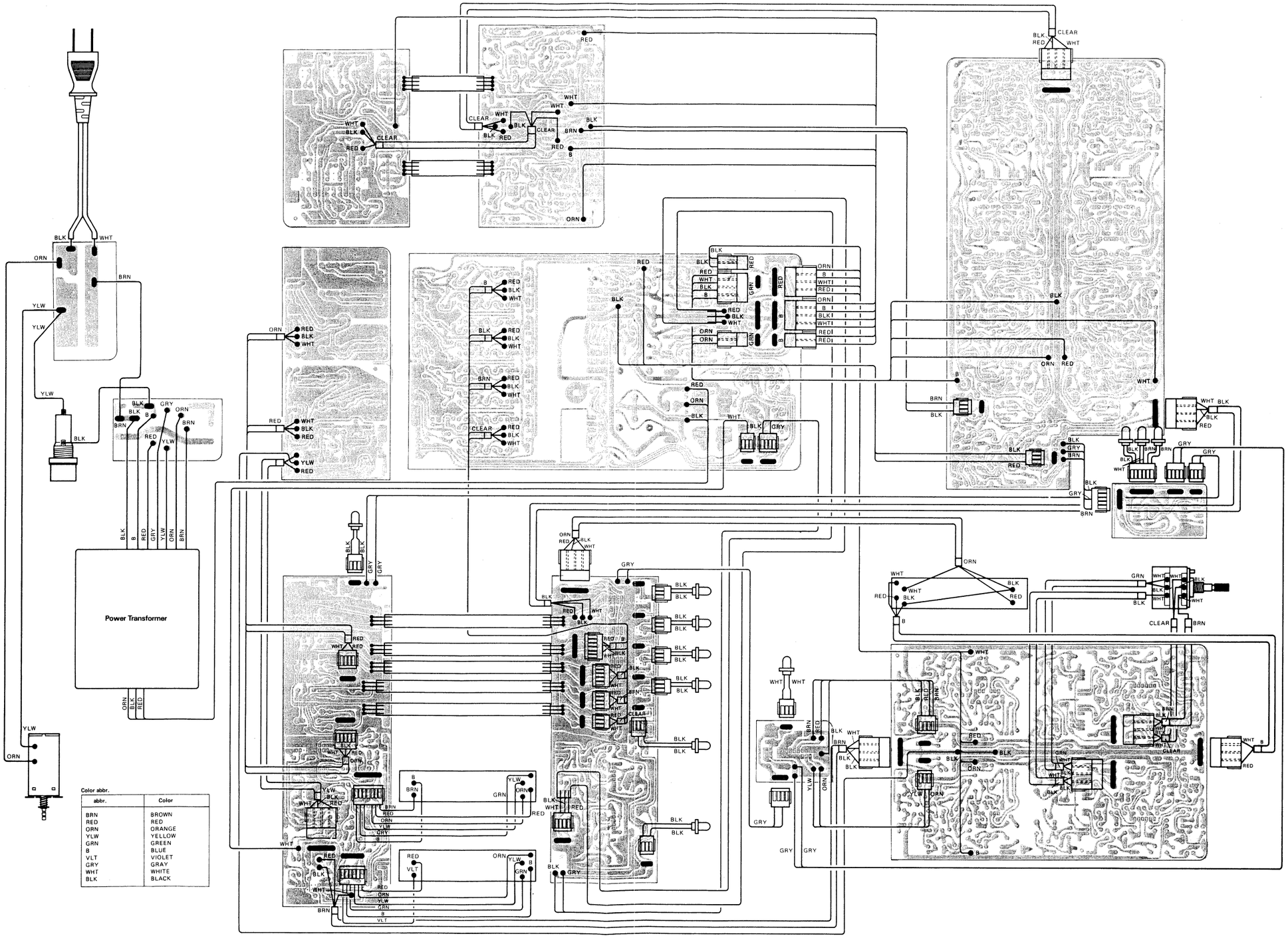


Fig. 5

P-L10
No. 2619

4. Connection Diagram

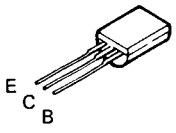


P-L10
No. 2619

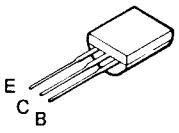
P-L10 Schematic Diagram & Block Diagram

Appearance of Transistors, ICs and Diodes

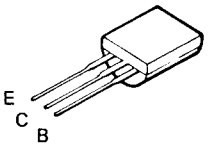
Transistors



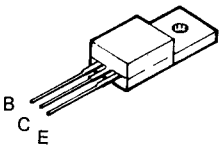
2SA872AV(D,E)
2SA970(GR,BL)
2SA1015(Y,GR)
2SA1084(D,E)
2SC1775AV(E,F)
2SC2546(E,F)



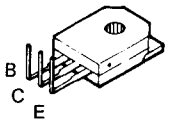
2SA965(O,Y)
2SC2235(O,Y)



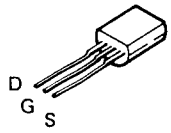
2SA1208(S,T)
2SC2910(S,T)



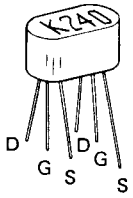
2SB507V(D,E)



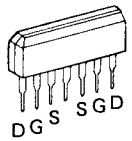
2SA1146(O)
2SC2706(O)



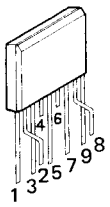
2SK147(BL)
2SK170(BL)
2SK246(V,BL)



2SK240(BL,V)



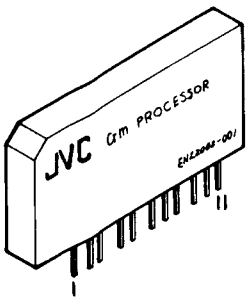
2SK150(GR)



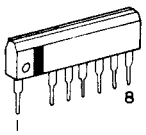
μPA75V

1 . . . B1
2 . . . C1
3 . . . E1
4 . . . NC
5 . . . SUB
6 . . . NC
7 . . . E2
8 . . . C2
9 . . . B2

Integrated Circuits

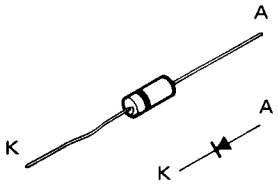


ENZ2002-001

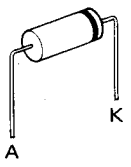


HA12017

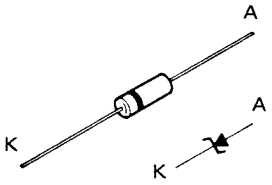
Diodes



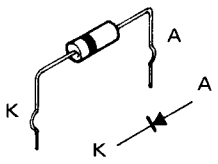
1S2076-31
1SS81



30DF2FA-2



RD2.7EB2
RD5.6EB3
RD6.2EB3
HZ3ALL
HZ4B



10DF2FD

2. Exploded View and Part Numbers

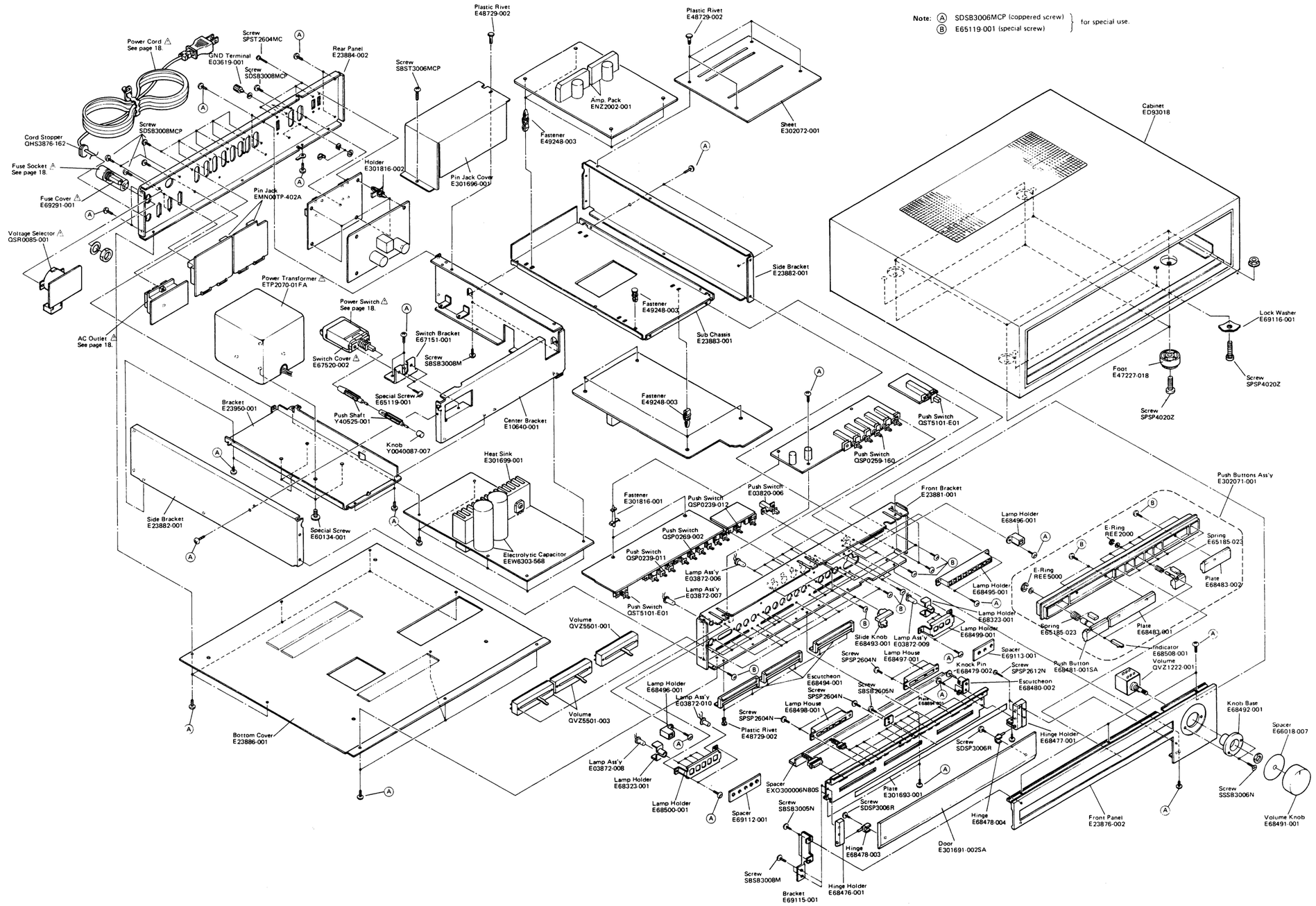


Fig. 4

3. Printed Circuit Board Ass'y and Parts List

3-(1) TXX-361□ Volume Amp. P.C. Board Ass'y

Note: TXX-361□-1 varies according to the areas employed. See note (1) when placing an order.

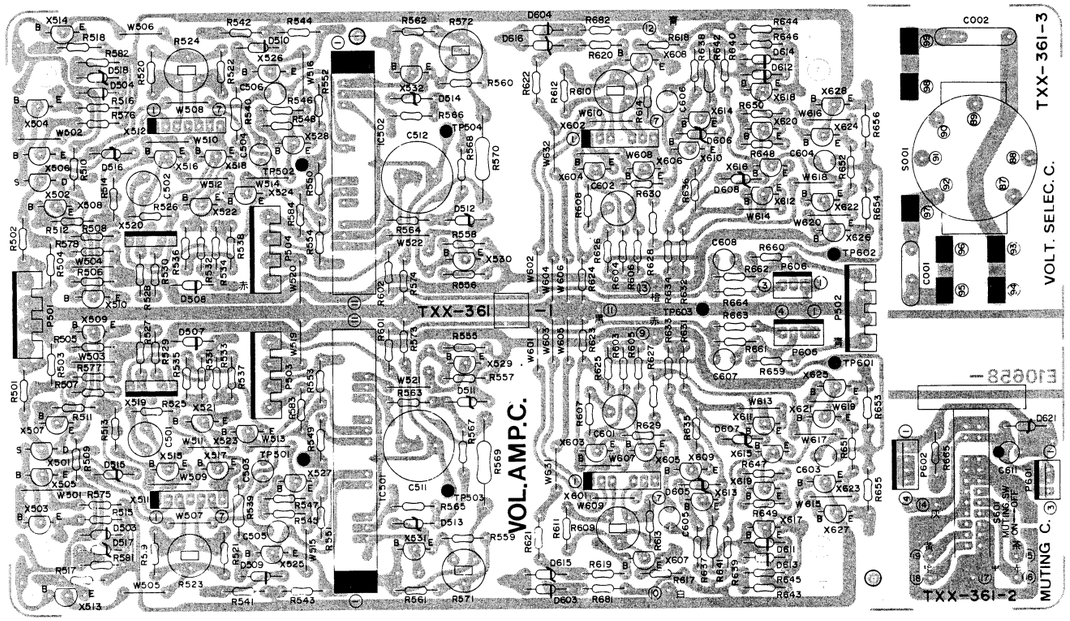


Fig. 5

Note (1)

Designated Areas	P.C. Board Ass'y
Europe & U.K.	TXX-361Ⓒ-1
U.S.A. & other areas	TXX-361Ⓑ-1

Note (2)

The symbols (赤、黒、白 ····· etc.) on P.C. Board surface are factory process only.

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X501	2SK246(BL,V)			F.E.T.	Toshiba
X502	2SK246(BL,V)			"	"
X503	2SC1775AV(E,F)			Silicon	Hitachi
X504	2SC1775AV(E,F)			"	"
X505	2SA965(O,Y)			"	Toshiba
X506	2SA965(O,Y)			"	"
X507	2SC1775AV(E,F)			"	Hitachi
X508	2SC1775AV(E,F)			"	"
X509	2SA1084(D,E)			"	"
X510	2SA1084(D,E)			"	"
X511	2SK150A(GR)			F.E.T.	Toshiba
X512	2SK150A(GR)			"	"
X513	2SC2546(E,F)			Silicon	Hitachi
X514	2SC2546(E,F)			"	"
X515	2SC2546(E,F)			"	"

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X516	2SC2546(E,F)			Silicon	Hitachi
X517	2SC2546(E,F)			"	"
X518	2SC2546(E,F)			"	"
X519	UPA75V(P,F)			"	NEC
X520	UPA75V(P,F)			"	"
X521	2SA872AV(D,E)			"	Hitachi
X522	2SA872AV(D,E)			"	"
X523	2SA872AV(D,E)			"	"
X524	2SA872AV(D,E)			"	"
X525	2SC1775AV(E,F)			"	"
X526	2SC1775AV(E,F)			"	"
X527	2SC2546(E,F)			"	"
X528	2SC2546(E,F)			"	"
X529	2SA1084(D,E)			"	"
X530	2SA1084(D,E)			"	"

Transistors

Item No.	Part Number	Rating	Description	
				Maker
X531	2SC2546(E,F)		Silicon	Hitachi
X532	2SC2546(E,F)		"	"
X601	2SK150A(GR)		F.E.T.	Toshiba
X602	2SK150A(GR)		"	"
X603	2SC2546(E,F)		Silicon	Hitachi
X604	2SC2546(E,F)		"	"
X605	2SC2546(E,F)		"	"
X606	2SC2546(E,F)		"	"
X607	2SC2546(E,F)		"	"
X608	2SC2546(E,F)		"	"
X609	2SA1084(D,E)		"	"
X610	2SA1084(D,E)		"	"
X611	2SA1084(D,E)		"	"
X612	2SA1084(D,E)		"	"
X613	2SA872AV(D,E)		"	"
X614	2SA872AV(D,E)		"	"
X615	2SA872AV(D,E)		"	"
X616	2SA872AV(D,E)		"	"
X617	2SC1775AV(E,F)		"	"
X618	2SC1775AV(E,F)		"	"
X619	2SC2546(E,F)		"	"
X620	2SC2546(E,F)		"	"
X621	2SC1775AV(E,F)		"	"
X622	2SC1775AV(E,F)		"	"
X623	2SA872AV(D,E)		"	"
X624	2SA872AV(D,E)		"	"
X625	2SC2235(O,Y)		"	Toshiba
X626	2SC2235(O,Y)		"	"
X627	2SA965(O,Y)		"	"
X628	2SA965(O,Y)		"	"

Diodes

Item No.	Part Number	Rating	Description	
				Maker
D503	1S2076-31		Silicon	Hitachi
D504	1S2076-31		"	"
D507	1S2076-31		"	"
D508	1S2076-31		"	"
D509	1S2076-31		"	"
D510	1S2076-31		"	"
D511	HZ3ALL		Zener	"
D512	HZ3ALL		"	"
D513	HZ3ALL		"	"
D514	HZ3ALL		"	"
D515	HZ3ALL		"	"
D516	HZ3ALL		"	"
D517	HZ6B1L		"	"
D518	HZ6B1L		"	"
D603	1S2076-31		Silicon	"
D604	1S2076-31		"	"
D605	HZ3ALL		Zener	"
D606	HZ3ALL		"	"
D607	HZ3ALL		"	"
D608	HZ3ALL		"	"
D611	1SS81		Silicon	"
D612	1SS81		"	"
D613	1S2076-31		"	"
D614	1S2076-31		"	"
D615	HZ6B1L		Zener	"
D616	HZ-6B1L		"	"
D621	RD5.6EB3		"	NEC

Capacitors

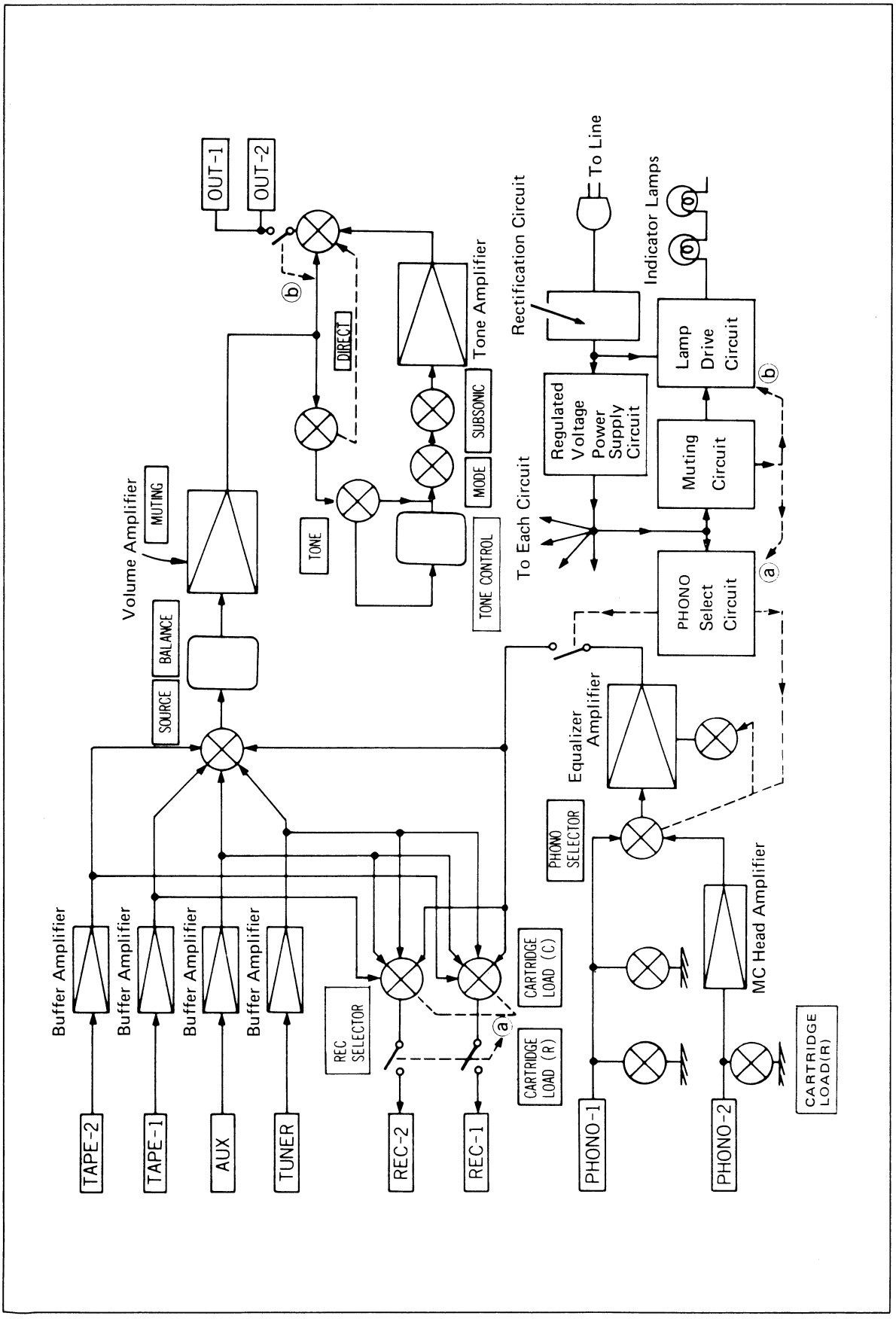
Item No.	Part Number	Rating		Description
C002	QFZ9010-103	0.01 μF	250 V	Film (for c only)
C501	QFS81HJ-103	"	50 V	Polystyrene
C502	QFS81HJ-103	"	"	"
C503	QFS81HJ-470	47 pF	"	"
C504	QFS81HJ-470	"	"	"
C505	QFS81HJ-470	"	"	"
C506	QFS81HJ-470	"	"	"
C511	EEN1001-225	2.2 μF	100 V	Non-Pole
C512	EEN1001-225	"	"	"
C601	QFS81HJ-682	6800 pF	50 V	Polystyrene
C602	QFS81HJ-682	"	"	"
C603	QFS81HJ-6R0	6 pF	"	"
C604	QFS81HJ-6R0	"	"	"
C605	QFS81HJ-3R0	3 pF	"	"
C606	QFS81HJ-3R0	"	"	"
C607	QFS81HJ-560	56 pF	"	"
C608	QFS81HJ-560	"	"	"
C611	QET51AR-476	47 μF	10 V	Electrolytic

Resistors

Item No.	Part Number	Rating		Description
R501	QRV141F-47R0	47 Ω	1/4 W	Metal Film ⚠
R502	QRV141F-47R0	47 Ω	"	"
R503	QRV141F-2203	220 kΩ	"	"
R504	QRV141F-2203	"	"	"
R505	QRZ0052-182	1.8 kΩ	"	Fusible ⚠
R506	QRZ0052-182	"	"	"
R507	QRZ0052-561	560 Ω	"	"
R508	QRZ0052-561	"	"	"
R509	QRD141J-333S	33 kΩ	"	Carbon
R510	QRD141J-333S	33 kΩ	"	"
R511	QRD149J-561S	560 Ω	"	UNF. Carbon ⚠
R512	QRD149J-561S	560 Ω	"	"
R513	QRD141J-222S	2.2 kΩ	"	Carbon
R514	QRD141J-222S	"	"	"
R515	QRD149J-222S	"	"	UNF. Carbon ⚠
R516	QRD149J-222S	"	"	"
R517	QRD149J-202S	2 kΩ	"	"
R518	QRD149J-202S	"	"	"
R519	QRD141J-220S	22 Ω	"	Carbon
R520	QRD141J-220S	"	"	"
R521	QRD141J-220S	"	"	"
R522	QRD141J-220S	"	"	"
R523	QVP4A0B-101	100 Ω		Variable
R524	QVP4A0B-101	"		"
R525	QRD141J-620S	62 Ω	1/4 W	Carbon
R526	QRD141J-620S	"	"	"
R527	QRD141J-561S	560 Ω	"	"
R528	QRD141J-561S	"	"	"
R529	QRD141J-561S	"	"	"
R530	QRD141J-561S	"	"	"
R531	QRD149J-271S	270 Ω	"	UNF. Carbon ⚠
R532	QRD149J-271S	"	"	"
R533	QRD149J-271S	"	"	"
R534	QRD149J-271S	"	"	"
R535	QRD141J-331S	330 Ω	"	Carbon
R536	QRD141J-331S	"	"	"
R537	QRD141J-331S	"	"	"
R538	QRD141J-331S	"	"	"
R539	QRD129J-123	12 kΩ	1/2 W	UNF. Carbon ⚠
R540	QRD129J-123	"	"	"
R541	QRZ0052-471	470 Ω	1/4W	Fusible ⚠
R542	QRZ0052-471	"	"	"
R543	QRZ0052-471	"	"	"
R544	QRZ0052-471	"	"	"
R545	QRD141J-302S	3 kΩ	"	Carbon
R546	QRD141J-302S	"	"	"
R547	QRD141J-102S	1 kΩ	"	Carbon

⚠ : Safety Parts

Block Diagram



P-L10

PARTS MANUAL

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1. Main Parts Locations

1-(1) Front View

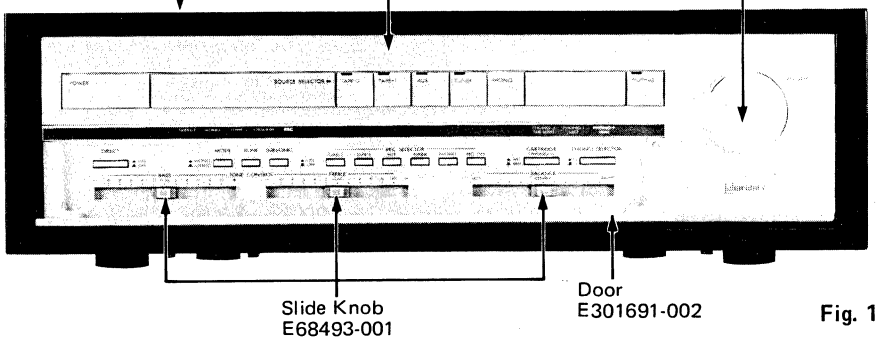


Fig. 1

1-(2) Rear View

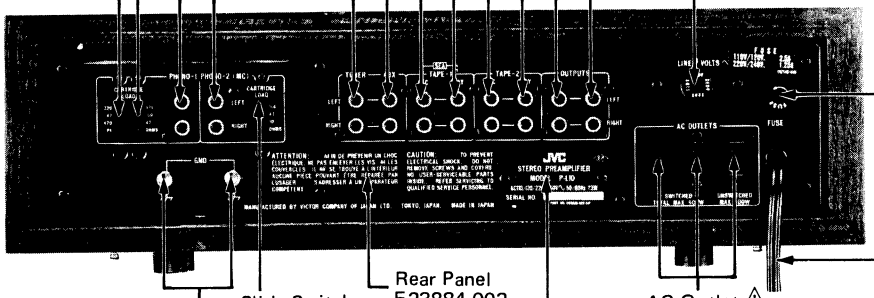


Fig. 2

1-(3) Top View

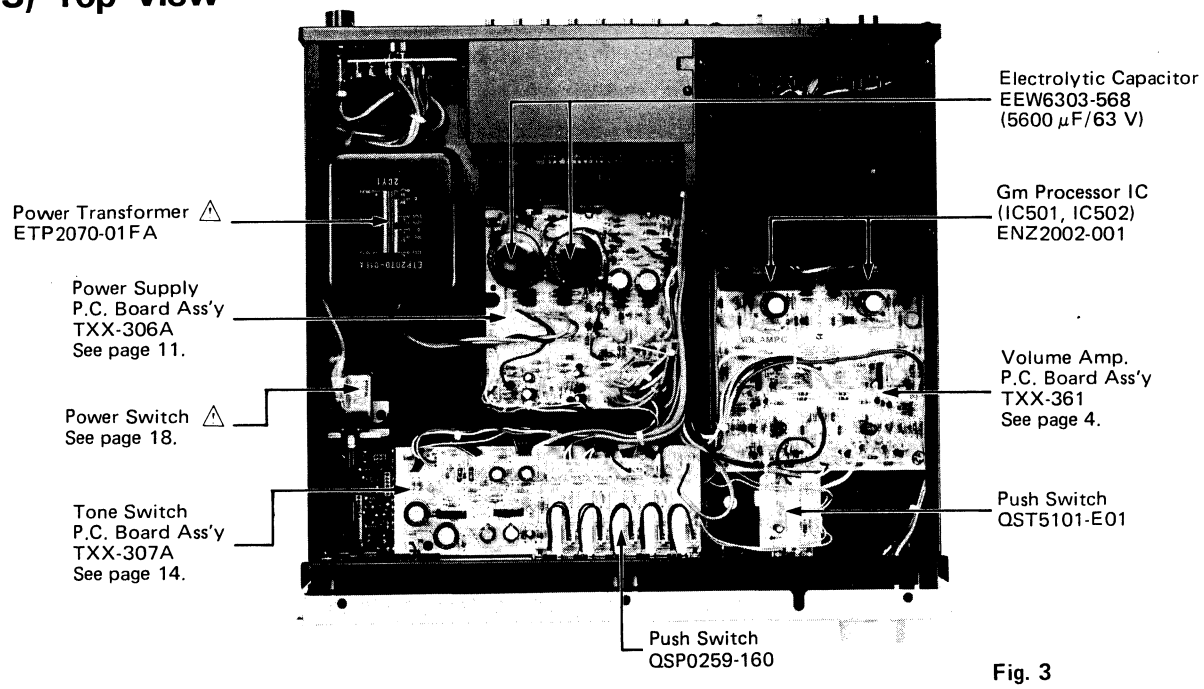


Fig. 3

Resistors

Item No.	Part Number	Rating		Description
R548	QRD141J-102S	1 kΩ	1/4 W	Carbon
R549	QRD149J-121S	120 Ω	"	UNF. Carbon ⚠
R550	QRD149J-121S	120 Ω	"	"
R551	QRD149J-121S	"	"	"
R552	QRD149J-121S	"	"	"
R553	QRD149J-331S	330 Ω	"	"
R554	QRD149J-331S	"	"	"
R555	QRV141F-4700	470 Ω	"	Metal Film ⚠
R556	QRV141F-4700	"	"	"
R557	QRV141F-4700	"	"	"
R558	QRV141F-4700	"	"	"
R559	QRV141F-4700	"	"	"
R560	QRV141F-4700	"	"	"
R561	QRV141F-4700	"	"	"
R562	QRV141F-4700	"	"	"
R563	QRD141J-182S	1.8 kΩ	"	Carbon
R564	QRD141J-182S	"	"	"
R565	QRD141J-182S	"	"	"
R566	QRD141J-182S	"	"	"
R567	QRD141J-563S	56 kΩ	"	"
R568	QRD141J-563S	"	"	"
R569	QRG027J-472	4.7 kΩ	2 W	O.M. Film ⚠
R570	QRG027J-472	"	"	"
R571	QVP4A0B-104	100 kΩ		Variable
R572	QVP4A0B-104	"		"
R573	QRD141J-473S	47 kΩ	1/4 W	Carbon
R574	QRD141J-473S	"	"	"
R575	QRZ0052-561	560 Ω	"	Fusible ⚠
R576	QRZ0052-561	"	"	"
R577	QRD149J-152S	1.5 kΩ	"	UNF. Carbon ⚠
R578	QRD149J-152S	"	"	"
R581	QRZ0052-221	220 Ω	"	Fusible ⚠
R582	QRZ0052-221	"	"	"
R583	QRD141J-221S	"	"	Carbon
R584	QRD141J-221S	"	"	"
R601	QRV141F-6201	6.2 kΩ	"	Metal Film ⚠
R602	QRV141F-6201	"	"	"
R603	QRD141J-332S	3.3 kΩ	"	Carbon
R604	QRD141J-332S	"	"	"
R605	QRD141J-332S	"	"	"
R606	QRD141J-332S	"	"	"
R607	QRD141J-390S	39 Ω	"	"
R608	QRD141J-390S	"	"	"
R609	QVP4A0B-101	100 Ω		Variable
R610	QVP4A0B-101	"		"
R611	QRD141J-220S	22 Ω	1/4 W	Carbon
R612	QRD141J-220S	"	"	"
R613	QRD141J-220S	"	"	"
R614	QRD141J-220S	"	"	"
R617	QRD149J-202S	2 kΩ	"	UNF. Carbon ⚠
R618	QRD149J-202S	"	"	"
R619	QRD149J-102S	1 kΩ	"	"
R620	QRD149J-102S	"	"	"
R621	QRD141J-183S	18 kΩ	"	Carbon
R622	QRD141J-183S	"	"	"
R623	QRD141J-272S	2.7 kΩ	"	"
R624	QRD141J-272S	"	"	"
R625	QRD141J-183S	18 kΩ	"	"
R626	QRD141J-183S	"	"	"
R627	QRD141J-471S	470 Ω	"	"
R628	QRD141J-471S	"	"	"
R629	QRD141J-471S	"	"	"
R630	QRD141J-471S	"	"	"
R631	QRZ0052-152	1.5 kΩ	"	Fusible ⚠
R632	QRZ0052-152	"	"	"
R633	QRZ0052-152	"	"	"
R634	QRZ0052-152	"	"	"
R635	QRD141J-820S	82 Ω	"	Carbon

⚠ : Safety Parts

Resistors

Item No.	Part Number	Rating		Description
R636	QRD141J-820S	82 Ω	1/4 W	Carbon
R637	QRD141J-683S	68 kΩ	"	"
R638	QRD141J-683S	"	"	"
R639	QRD141J-683S	"	"	"
R640	QRD141J-683S	"	"	"
R641	QRD129J-183	18 kΩ	1/2 W	UNF. Carbon ⚠
R642	QRD129J-183	"	"	"
R643	QRD149J-471S	470 Ω	1/4 W	"
R644	QRD149J-471S	"	"	"
R645	QRD149J-471S	"	"	"
R646	QRD149J-471S	"	"	"
R647	QRD141J-332S	3.3 kΩ	"	Carbon
R648	QRD141J-332S	"	"	"
R649	QRD149J-102S	1 kΩ	"	UNF. Carbon ⚠
R650	QRD149J-102S	"	"	"
R651	QRD149J-331S	330 Ω	"	"
R652	QRD149J-331S	"	"	"
R653	QRD149J-220S	22 Ω	"	"
R654	QRD149J-220S	"	"	"
R655	QRD149J-220S	"	"	"
R656	QRD149J-220S	"	"	"
R659	QRV141F-10R0	10 Ω	"	Metal Film ⚠
R660	QRV141F-10R0	"	"	"
R661	QRV141F-1002	10 kΩ	"	"
R662	QRV141F-1002	"	"	"
R663	QRD141J-122S	1.2 kΩ	"	Carbon
R664	QRD141J-122S	"	"	"
R665	QRD141J-270S	27 Ω	"	"

⚠ : Safety Parts

Others

Item No.	Part Number	Rating	Description
	E10658-001		Circuit Board
	E68768-001		"
J605	EWS014-060		4P Socket
J606	EWS013-097		3P Socket
J805	EWS084-007		4P Socket
J806	EWS082-004		2P Socket
J953	EWS014-053		4P Socket
P501	E04359-004		4P Plug
P502	E04359-004		"
P503	E04359-004		"
P504	E04359-004		"
P601	QMV5005-003		3P Plug
P602	QMV5005-004		4P Plug
P605	QMV5005-004		"
P606	QMV5005-003		3P Plug
S002	QSR0085-001		Rotary Switch ⚠ (Voltage Selector)
S601	QST5101-E01		Push Switch (Muting)
IC501	ENZ2002-001		Amp. Pack (Gm Processor)
IC502	ENZ2002-001		" (")

⚠ : Safety Parts

3-(2) TXX-305□ Equalizer P.C. Board Ass'y

Note: TXX-305□-1 varies according to areas employed. See note (1) when placing an order.

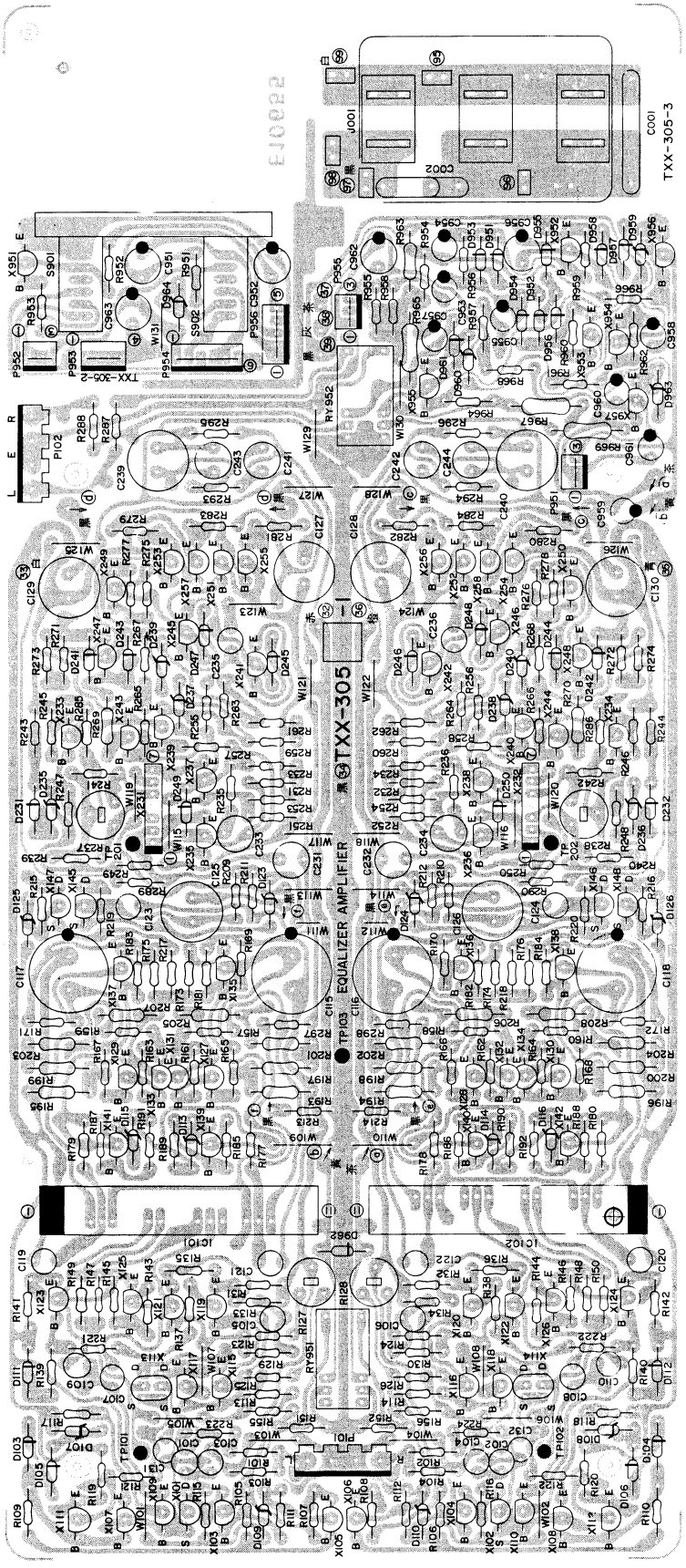


Fig. 6

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X101	2SK246(BL,V)			F.E.T.	Toshiba
X102	2SK246(BL,V)			"	"
X103	2SC1775AV(E,F)			Silicon	Hitachi
X104	2SC1775AV(E,F)			"	"
X105	2SA1084(D,E)			"	"
X106	2SA1084(D,E)			"	"
X107	2SC1775AV(E,F)			"	"
X108	2SC1775AV(E,F)			"	"
X109	2SA1084(D,E)			"	"
X110	2SA1084(D,E)			"	"
X111	2SC2546(E,F)			"	"
X112	2SC2546(E,F)			"	"
X113	2SK240(BL,V)			F.E.T.	Toshiba
X114	2SK240(BL,V)			"	"
X115	2SC2546(E,F)			Silicon	Hitachi

Note (1)

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X116	2SC2546(E,F)			Silicon	Hitachi
X117	2SC2546(E,F)			"	"
X118	2SC2546(E,F)			"	"
X119	2SA872AV(D,E)			"	"
X120	2SA872AV(D,E)			"	"
X121	2SA872AV(D,E)			"	"
X122	2SA872AV(D,E)			"	"
X123	2SC1775AV(E,F)			"	"
X124	2SC1775AV(E,F)			"	"
X125	2SC2546(E,F)			"	"
X126	2SC2546(E,F)			"	"
X127	2SA1084(D,E)			"	"
X128	2SA1084(D,E)			"	"
X129	2SC2546(E,F)			"	"
X130	2SC2546(E,F)			"	"

Designated Areas	P.C. Board Ass'y
Europe & U.K.	TXX-305D-1
U.S.A. & other areas	TXX-305B-1

Note (2)

The symbols (赤、黒、白 ..... etc.) on P.C. Board surface are factory process only.

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X131	2SC2546(E,F)			Silicon	Hitachi
X132	2SC2546(E,F)			"	"
X133	2SA1084(D,E)			"	"
X134	2SA1084(D,E)			"	"
X135	2SC2546(E,F)			"	"
X136	2SC2546(E,F)			"	"
X137	2SA1084(D,E)			"	"
X138	2SA1084(D,E)			"	"
X139	2SC2546(E,F)			"	"
X140	2SC2546(E,F)			"	"
X141	2SA1084(D,E)			"	"
X142	2SA1084(D,E)			"	"
X145	2SK170(BL)			F.E.T.	Toshiba
X146	2SK170(BL)			"	"
X147	2SK246(BL)			"	"
X148	2SK246(BL)			"	"
X231	2SK150A(GR)			"	"
X232	2SK150A(GR)			"	"
X233	2SC2546(E,F)			Silicon	Hitachi
X234	2SC2546(E,F)			"	"
X235	2SC2546(E,F)			"	"
X236	2SC2546(E,F)			"	"
X237	2SC2546(E,F)			"	"
X238	2SC2546(E,F)			"	"
X239	2SA1084(D,E)			"	"
X240	2SA1084(D,E)			"	"
X241	2SA1084(D,E)			"	"
X242	2SA1084(D,E)			"	"
X243	2SA872AV(D,E)			"	"
X244	2SA872AV(D,E)			"	"
X245	2SA872AV(D,E)			"	"
X246	2SA872AV(D,E)			"	"
X247	2SC1775AV(E,F)			"	"
X248	2SC1775AV(E,F)			"	"
X249	2SC2546(E,F)			"	"
X250	2SC2546(E,F)			"	"
X251	2SC1775AV(E,F)			"	"
X252	2SC1775AV(E,F)			"	"
X253	2SA872AV(D,E)			"	"
X254	2SA872AV(D,E)			"	"
X255	2SC2235(O,Y)			"	Toshiba
X256	2SC2235(O,Y)			"	"
X257	2SA965(O,Y)			"	"
X258	2SA965(O,Y)			"	"
X951	2SC2240(GR,BL)			"	"
X952	2SC2240(GR,BL)			"	"
X953	2SA970(GR,BL)			"	"
X954	2SC2240(GR,BL)			"	"
X955	2SC2240(GR,BL)			"	"
X956	2SC2240(GR,BL)			"	"
X957	2SC2240(GR,BL)			"	"

Diodes

Item No.	Part Number	Rating	Description	
				Maker
D101	HZ3ALL		Zener	Hitachi
D102	HZ3ALL		"	"
D103	1S2076-31		Silicon	"
D104	1S2076-31		"	"
D105	1S2076-31		"	"
D106	1S2076-31		"	"
D107	HZ6C3L		Zener	"
D108	HZ6C3L		"	"
D109	HZ6B1L		"	"
D110	HZ6B1L		"	"

Diodes

Item No.	Part Number	Rating	Description	
				Maker
D111	1S2076-31		Silicon	Hitachi
D112	1S2076-31		"	"
D113	HZ6B1L		Zener	"
D114	HZ6B1L		"	"
D115	HZ6B1L		"	"
D116	HZ6B1L		"	"
D117	1S2076-31		Silicon	"
D118	1S2076-31		"	"
D119	1S2076-31		"	"
D120	1S2076-31		"	"
D123	HZ27-2L		Zener	"
D124	HZ27-2L		"	"
D125	HZ27-2L		"	"
D126	HZ27-2L		"	"
D231	1S2076-31		Silicon	"
D232	1S2076-31		"	"
D235	HZ6B1L		Zener	"
D236	HZ6B1L		"	"
D237	HZ3ALL		"	"
D238	HZ3ALL		"	"
D239	HZ3ALL		"	"
D240	HZ3ALL		"	"
D241	1S2076-31		Silicon	"
D242	1S2076-31		"	"
D243	1SS81		"	"
D244	1SS81		"	"
D245	1S2076-31		"	"
D246	1S2076-31		"	"
D247	1SS81		"	"
D248	1SS81		"	"
D249	1S2076-31		"	"
D250	1S2076-31		"	"
D951	1S2076-31		"	"
D952	1S2076-31		"	"
D953	1S2076-31		"	"
D954	1S2076-31		"	"
D955	1S2076-31		"	"
D956	1S2076-31		"	"
D957	1S2076-31		"	"
D958	1S2076-31		"	"
D959	RD2.7EB2		Zener	NEC
D960	RD2.7EB2		"	"
D961	1S2076-31		Silicon	Hitachi
D962	1S2076-31		"	"
D963	RD2.7EB2		Zener	NEC
D964	RD5.6EB3		"	"

Capacitors

Item No.	Part Number	Rating		Description
C002	QFZ9010-103	0.01 μF	250 V	Metalized Mylar (for B only)
C101	QFS81HJ-151	150 pF	50 V	Polystyrene
C102	QFS81HJ-151	"	"	"
C103	QFS81HJ-102	1000 pF	"	"
C104	QFS81HJ-102	"	"	"
C105	QFS81HJ-681	680 pF	"	"
C106	QFS81HJ-681	"	"	"
C107	QFS81HJ-330	33 pF	"	"
C108	QFS81HJ-330	"	"	"
C109	QFS81HJ-330	"	"	"
C110	QFS81HJ-330	"	"	"
C115	EEZ1002-475	4.7 μF	100 V	Electrolytic
C116	EEZ1002-475	"	"	"
C117	EEZ1002-475	"	"	"

Capacitors

Item No.	Part Number	Rating		Description
C118	EEZ1002-475	4.7 μF	100 V	Electrolytic
C119	QFS81HJ-390	39 pF	50 V	Polystyrene
C120	QFS81HJ-390	"	"	"
C121	QFS81HJ-390	"	"	"
C122	QFS81HJ-390	"	"	"
C123	QFS81HJ-222	2200 pF	"	"
C124	QFS81HJ-222	"	"	"
C125	EEN1001-105	1 μF	100 V	Non-Pole
C126	EEN1001-105	"	"	"
C127	QFS81HJ-203	0.02 μF	50 V	Polystyrene
C128	QFS81HJ-203	"	"	"
C129	QFS81HJ-203	"	"	"
C130	QFS81HJ-203	"	"	"
C131	QFS81HJ-330	33 pF	"	"
C132	QFS81HJ-330	"	"	"
C231	EEN1001-224	0.22 μF	100 V	Non-Pole
C232	EEN1001-224	"	"	"
C233	QFS81HJ-682	6800 pF	50 V	Polystyrene
C234	QFS81HJ-682	"	"	"
C235	QFS81HJ-6R0	6.0 pF	"	"
C236	QFS81HJ-6R0	"	"	"
C239	QFS81HG-203	0.02 μF	"	"
C240	QFS81HG-203	"	"	"
C241	QFS81HG-103	0.01 μF	"	"
C242	QFS81HG-103	"	"	"
C243	QFS81HG-912	9100 pF	"	"
C244	QFS81HG-912	"	"	"
C951	QET51HR-476	47 μF	"	Electrolytic
C952	QET51HR-476	"	"	"
C953	QET51HR-225	2.2 μF	"	"
C954	QET51HR-225	"	"	"
C955	QET51HR-225	"	"	"
C956	QET50JR-227	220 μF	6.3 V	"
C957	QET51HR-225	2.2 μF	50 V	"
C958	QET51AR-476	47 μF	10 V	"
C959	QET51HR-225	2.2 μF	50 V	"
C960	QET51AR-476	47 μF	10 V	"
C961	QET51HR-225	2.2 μF	50 V	"
C962	QET51HR-476	47 μF	"	"
C963	QET51AR-227	220 μF	10 V	"

Resistors

Item No.	Part Number	Rating		Description
R101	QRV141F-10R0	10 Ω	1/4 W	Metal Film ⚠
R102	QRV141F-10R0	"	"	"
R103	QRV141F-4702	47 kΩ	"	"
R104	QRV141F-4702	"	"	"
R105	QRZ0052-331	330 Ω	"	Fusible ⚠
R106	QRZ0052-331	"	"	"
R107	QRZ0052-561	560 Ω	"	"
R108	QRZ0052-561	"	"	"
R109	QRD141J-333S	33 kΩ	"	Carbon
R110	QRD141J-333S	"	"	"
R111	QRD141J-222S	2.2 kΩ	"	"
R112	QRD141J-222S	"	"	"
R113	QRD141J-391S	390 Ω	"	"
R114	QRD141J-391S	"	"	"
R115	QRD141J-162S	1.6 kΩ	"	"
R116	QRD141J-162S	"	"	"
R117	QRD149J-222S	2.2 kΩ	"	UNF, Carbon ⚠
R118	QRD149J-222S	"	"	"
R119	QRD149J-681S	680 Ω	"	"
R120	QRD149J-681S	"	"	"
R121	QRD149J-122S	1.2 kΩ	"	"
R122	QRD149J-122S	"	"	"
R123	QRV141F-3301	3.3 kΩ	"	Metal Film ⚠
R124	QRV141F-3301	"	"	"
R125	QRV141F-3301	"	"	"

⚠ : Safety Parts

Resistors

Item No.	Part Number	Rating		Description
R126	QRV141F-3301	3.3 kΩ	1/4 W	Metal Film ⚠
R127	QVZ3501-102	1 kΩ		Variable
R128	QVZ3501-102	"		"
R129	QRD141J-391S	390 Ω	1/4 W	Carbon
R130	QRD141J-391S	"	"	"
R131	QRV141F-6801	6.8 kΩ	"	Metal Film ⚠
R132	QRV141F-6801	"	"	"
R133	QRV141F-6801	"	"	"
R134	QRV141F-6801	"	"	"
R135	QRD141J-272S	2.7 kΩ	"	Carbon
R136	QRD141J-272S	"	"	"
R137	QRD141J-682S	6.8 kΩ	"	"
R138	QRD141J-682S	"	"	"
R139	QRD149J-681S	680 Ω	"	UNF, Carbon ⚠
R140	QRD149J-681S	"	"	"
R141	QRD149J-681S	"	"	"
R142	QRD149J-681S	"	"	"
R143	QRD141J-302S	3 kΩ	"	Carbon
R144	QRD141J-302S	"	"	"
R145	QRD141J-102S	1 kΩ	"	"
R146	QRD141J-102S	"	"	"
R147	QRD141J-390S	39 Ω	"	"
R148	QRD141J-390S	"	"	"
R149	QRD141J-390S	"	"	"
R150	QRD141J-390S	"	"	"
R151	QRV141F-1540	154 Ω	"	Metal Film ⚠
R152	QRV141F-1540	"	"	"
R155	QRV141F-13R0	13 Ω	"	"
R156	QRV141F-13R0	"	"	"
R157	QRD141J-101S	100 Ω	"	Carbon
R158	QRD141J-101S	"	"	"
R159	QRD141J-101S	"	"	"
R160	QRD141J-101S	"	"	"
R161	QRD141J-821S	820 Ω	"	"
R162	QRD141J-821S	"	"	"
R163	QRD141J-821S	"	"	"
R164	QRD141J-821S	"	"	"
R165	QRD141J-101S	100 Ω	"	"
R166	QRD141J-101S	"	"	"
R167	QRD141J-101S	"	"	"
R168	QRD141J-101S	"	"	"
R169	QRD141J-682S	6.8 kΩ	"	"
R170	QRD141J-682S	"	"	"
R171	QRD148J-682S	"	"	"
R172	QRD148J-682S	"	"	"
R173	QRD141J-242S	2.4 kΩ	"	"
R174	QRD141J-242S	"	"	"
R175	QRD141J-242S	"	"	"
R176	QRD141J-242S	"	"	"
R177	QRD149J-152S	15 kΩ	"	UNF, Carbon ⚠
R178	QRD149J-152S	"	"	"
R179	QRD149J-152S	"	"	"
R180	QRD149J-152S	"	"	"
R181	QRD141J-682S	6.8 kΩ	"	Carbon
R182	QRD141J-682S	"	"	"
R183	QRD148J-682S	"	"	"
R184	QRD141J-682S	"	"	"
R185	QRD141J-272S	2.7 kΩ	"	"
R186	QRD141J-272S	"	"	"
R187	QRD148J-272S	"	"	"
R188	QRD141J-272S	"	"	"
R189	QRD141J-622S	6.2 kΩ	"	"
R190	QRD141J-622S	"	"	"
R191	QRD141J-622S	"	"	"
R192	QRD141J-622S	"	"	"
R193	QRV121F-2000	200 Ω	1/2 W	Metal Film ⚠
R194	QRV121F-2000	"	"	"
R195	QRV121F-2000	"	"	"
R196	QRV121F-2000	"	"	"
R197	QRV121F-2000	"	"	"

⚠ : Safety Parts

Resistors

Item No.	Part Number	Rating		Description
R198	QRV121F-2000	200 Ω	1/2 W	Metal Film ⚠
R199	QRV121F-2000	"	"	"
R200	QRV121F-2000	"	"	"
R201	QRV121F-2000	"	"	"
R202	QRV121F-2000	"	"	"
R203	QRV121F-2000	"	"	"
R204	QRV121F-2000	"	"	"
R205	QRV121F-2200	220 Ω	"	"
R206	QRV121F-2200	"	"	"
R207	QRV121F-2200	"	"	"
R208	QRV121F-2200	"	"	"
R209	QRD141J-475S	4.7 MΩ	1/4 W	Carbon
R210	QRD141J-475S	"	"	"
R211	QRD141J-475S	"	"	"
R212	QRD141J-475S	"	"	"
R213	QRD141J-164S	160 kΩ	"	"
R214	QRD141J-164S	"	"	"
R215	QRD149J-102S	1 kΩ	"	UNF. Carbon ⚠
R216	QRD149J-102S	"	"	"
R217	QRD141J-362S	3.6 kΩ	"	Carbon
R218	QRD141J-362S	"	"	"
R219	QRD148J-131S	130 Ω	"	"
R220	QRD148J-131S	"	"	"
R221	QRD141J-682S	6.8 kΩ	"	"
R222	QRD141J-682S	"	"	"
R231	QRD141J-332S	3.3 kΩ	"	"
R232	QRD141J-332S	"	"	"
R233	QRD141J-332S	"	"	"
R234	QRD141J-332S	"	"	"
R235	QRD141J-150S	15 Ω	"	"
R236	QRD141J-150S	"	"	"
R237	QVP4A0B-101	100 Ω		Variable
R238	QVP4A0B-101	"		"
R239	QRD141J-220S	22 Ω	1/4 W	Carbon
R240	QRD141J-220S	"	"	"
R241	QRD141J-220S	"	"	"
R242	QRD141J-220S	"	"	"
R243	QRZ0052-221	220 Ω	"	Fusible ⚠
R244	QRZ0052-221	"	"	"
R245	QRD149J-202S	2 kΩ	"	UNF. Carbon ⚠
R246	QRD149J-202S	"	"	"
R247	QRD149J-102S	1 kΩ	"	"
R248	QRD149J-102S	"	"	"
R249	QRD141J-183S	18 kΩ	"	Carbon
R250	QRD141J-183S	"	"	"
R251	QRD141J-272S	2.7 kΩ	"	"
R252	QRD141J-272S	"	"	"
R253	QRD141J-183S	18 kΩ	"	"
R254	QRD141J-183S	"	"	"
R255	QRD141J-471S	470 Ω	"	"
R256	QRD141J-471S	"	"	"
R257	QRD141J-471S	"	"	"
R258	QRD141J-471S	"	"	"
R259	QRZ0052-152	1.5 kΩ	"	Fusible ⚠
R260	QRZ0052-152	"	"	"
R261	QRZ0052-152	"	"	"
R262	QRZ0052-152	"	"	"
R263	QRD148J-8R2S	8.2 Ω	"	Carbon
R264	QRD148J-8R2S	"	"	"
R265	QRD141J-683S	68 kΩ	"	"
R266	QRD141J-683S	"	"	"
R267	QRD141J-683S	"	"	"
R268	QRD141J-683S	"	"	"
R269	QRD129J-183	18 kΩ	1/2 W	UNF. Carbon ⚠
R270	QRD129J-183	"	"	"
R271	QRD149J-102S	1 kΩ	1/4 W	"
R272	QRD149J-102S	"	"	"
R273	QRD149J-102S	"	"	"
R274	QRD149J-102S	"	"	"
R275	QRD141J-332S	3.3 kΩ	"	Carbon

Resistors

Item No.	Part Number	Rating		Description
R276	QRD141J-332S	3.3 kΩ	1/4 W	Carbon
R277	QRD149J-102S	1 kΩ	"	UNF. Carbon ⚠
R278	QRD149J-102S	"	"	"
R279	QRD149J-331S	330 Ω	"	"
R280	QRD149J-331S	"	"	"
R281	QRD149J-220S	22 Ω	"	"
R282	QRD149J-220S	"	"	"
R283	QRD149J-220S	"	"	"
R284	QRD149J-220S	"	"	"
R285	QRZ0052-221	220 Ω	"	Fusible ⚠
R286	QRZ0052-221	"	"	"
R287	QRV141F-82R0	82.0 Ω	"	Metal Film ⚠
R288	QRV141F-82R0	"	"	"
R289	QRV141F-4703	470 kΩ	"	"
R290	QRV141F-4703	"	"	"
R293	QRV141F-8061	8.06 kΩ	"	"
R294	QRV141F-8061	"	"	"
R295	QRV141F-1203	120KΩ	"	"
R296	QRV141F-1203	"	"	"
R297	QRD141J-330S	33 Ω	"	Carbon
R298	QRD141J-330S	"	"	"
R951	QRD141J-101S	100 Ω	"	"
R952	QRD141J-101S	"	"	"
R953	QRD141J-473S	47 kΩ	"	"
R954	QRD141J-103S	10 kΩ	"	"
R955	QRD141J-103S	"	"	"
R956	QRD141J-103S	"	"	"
R957	QRD148J-103S	"	"	"
R958	QRD141J-223S	22 kΩ	"	"
R959	QRD141J-333S	33 kΩ	"	"
R960	QRD141J-333S	"	"	"
R961	QRD141J-472S	4.7 kΩ	"	"
R962	QRD141J-103S	10 kΩ	"	"
R963	QRD129J-682	6.8 kΩ	1/2 W	UNF. Carbon ⚠
R964	QRD141J-224S	220 kΩ	1/4 W	Carbon
R965	QRG017J-681S	680 Ω	1 W	O.M. Film ⚠
R966	QRD148J-823S	82 kΩ	1/4 W	Carbon
R967	QRG017J-681S	680 Ω	1 W	O.M. Film ⚠
R968	QRD141J-823S	82 kΩ	1/4 W	Carbon
R969	QRG017J-681S	680 Ω	1 W	O.M. Film ⚠

⚠ : Safety Parts

Others

Item No.	Part Number	Rating	Description
	E10655-002		Circuit Board
	E68768-001		Circuit Board
J001	QMC0637-004		AC Socket (for B only)
J803	EWS084-008		4P Socket
J804	EWS082-005		2P Socket
J956	EWS015-059		5P Socket
P101	E04359-004		4P Plug
P102	E04359-004		"
P951	QMV5005-003		3P Plug
P952	QMV5005-003		"
P953	QMV5005-004		4P Plug
P954	QMV5005-006		6P Plug
P955	QMV5005-003		3P Plug
P956	QMV5005-005		5P Plug
S951	QSP0239-012		Push Switch (Phono)
RY951	ESK8D24-211		Relay
RY952	ESK8D24-211		"
IC101	ENZ2002-001		Amp. Pack (Gm Processor)
IC102	ENZ2002-001		" (")

3-(3) TXX-306A Power Supply P.C. Board Ass'y

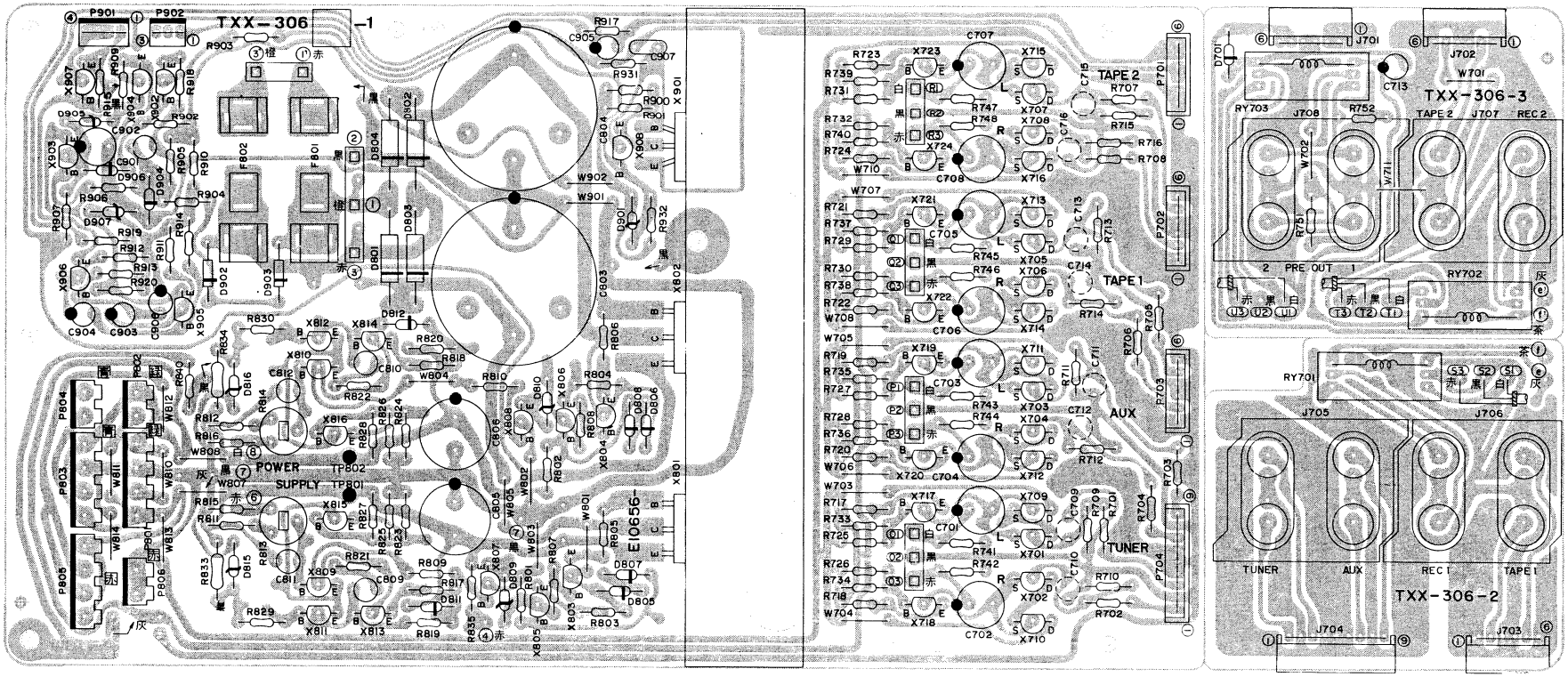


Fig. 7

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X701	2SK170(BL)			F.E.T.	Toshiba
X702	2SK170(BL)			"	"
X703	2SK170(BL)			"	"
X704	2SK170(BL)			"	"
X705	2SK170(BL)			"	"
X706	2SK170(BL)			"	"
X707	2SK170(BL)			"	"
X708	2SK170(BL)			"	"
X709	2SK246(BL)			"	"
X710	2SK246(BL)			"	"
X711	2SK246(BL)			"	"
X712	2SK246(BL)			"	"
X713	2SK246(BL)			"	"
X714	2SK246(BL)			"	"
X715	2SK246(BL)			"	"

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X716	2SK246(BL)			F.E.T.	Toshiba
X717	2SC1775AV(E,F)			Silicon	Hitachi
X718	2SC1775AV(E,F)			"	"
X719	2SC1775AV(E,F)			"	"
X720	2SC1775AV(E,F)			"	"
X721	2SC1775AV(E,F)			"	"
X722	2SC1775AV(E,F)			"	"
X723	2SC1775AV(E,F)			"	"
X724	2SC1775AV(E,F)			"	"
X801	2SC2706(O)			"	Toshiba
X802	2SA1146(O)			"	"
X803	2SC2910(S,T)			"	Sanyo
X804	2SA1208(S,T)			"	"
X805	2SA872AV(D,E)			"	Hitachi
X806	2SC1775AV(E,F)			"	"

Note:
The symbols (赤、黒、白 ····· etc.) on P.C. Board surface are factory process only.

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X807	2SA872AV(D,E)			Silicon	Hitachi
X808	2SC1775AV(E,F)			"	"
X809	2SC1775AV(E,F)			"	"
X810	2SA872AV(D,E)			"	"
X811	2SC1775AV(E,F)			"	"
X812	2SA872AV(D,E)			"	"
X813	2SA872AV(D,E)			"	"
X814	2SC1775AV(E,F)			"	"
X815	2SC2546(E,F)			"	"
X816	2SA1084(D,E)			"	"
X901	2SB507V(D,E)			"	Sanyo
X902	2SA970(GR,BL)			"	Toshiba
X903	2SA970(GR,BL)			"	"
X904	2SA1084(D,E)			"	Hitachi
X905	2SA970(GR,BL)			"	Toshiba
X906	2SA970(GR,BL)			"	"
X907	2SA1015(Y,GR)			"	"
X908	2SC2240(GR,BL)			"	"

Diodes

Item No.	Part Number	Rating	Description	
				Maker
D701	1S2076-31		Silicon	Hitachi
D801	30DF2FA-2		"	Nippon Inter
D802	30DF2FA-2		"	"
D803	30DF2FA-2		"	"
D804	30DF2FA-2		"	"
D805	1S2076-31		"	Hitachi
D806	1S2076-31		"	"
D807	1S2076-31		"	"
D808	1S2076-31		"	"
D809	HZ6C3L		Zener	"
D810	HZ6C3L		"	"
D811	1S2076-31		Silicon	"
D812	1S2076-31		"	"
D815	HZ6C3L		Zener	"
D816	HZ6C3L		"	"
D901	HZ4BLL		"	"
D902	10DF2FD		Silicon	Nippon Inter
D903	10DF2FD		"	"
D904	1S2076-31		"	Hitachi
D905	RD6.2EB3		Zener	NEC
D906	1S2076-31		Silicon	Hitachi
D907	RD5.6EB3		Zener	NEC

Capacitors

Item No.	Part Number	Rating		Description
C701	EEZ5001-475	4.7 μF	100 V	Electrolytic
C702	EEZ5001-475	"	"	"
C703	EEZ5001-475	"	"	"
C704	EEZ5001-475	"	"	"
C705	EEZ5001-475	"	"	"
C706	EEZ5001-475	"	"	"
C707	EEZ5001-475	"	"	"
C708	EEZ5001-475	"	"	"
C711	QET51HR-105	1 μF	50 V	"
C712	QET51HR-105	"	"	"
C713	QET51HR-105	"	"	"
C803	EEW6303-568	5600 μF	63 V	"
C804	EEW6303-568	"	"	"
C805	EEZ1002-475	4.7 μF	100 V	"
C806	EEZ1002-475	"	"	"

Capacitors

Item No.	Part Number	Rating		Description
C809	QFS81HJ-220	22 pF	50 V	Polystyrene
C810	QFS81HJ-150	15 pF	"	"
C811	QFS81HJ-100	10 pF	"	"
C812	QFS81HJ-100	"	"	"
C901	QEZ0046-225	2.2 μF	"	Non-Pole
C902	QET51AR-227	220 μF	10 V	Electrolytic
C903	QET51HR-475	4.7 μF	50 V	"
C904	QET51HR-475	"	"	"
C905	QET51HR-105	1 μF	"	"
C906	QET51ER-106	10 μF	25 V	"
C907	QFM81HJ-153	0.015 μF	50 V	Mylar

Resistors

Item No.	Part Number	Rating		Description
R701	QRD141J-221S	220 Ω	1/4 W	Carbon
R702	QRD141J-221S	"	"	"
R703	QRD141J-221S	"	"	"
R704	QRD141J-221S	"	"	"
R705	QRD141J-221S	"	"	"
R706	QRD141J-221S	"	"	"
R707	QRD141J-221S	"	"	"
R708	QRD141J-221S	"	"	"
R709	QRD141J-473S	47 kΩ	"	"
R710	QRD141J-473S	"	"	"
R711	QRD141J-473S	"	"	"
R712	QRD141J-473S	"	"	"
R713	QRD141J-473S	"	"	"
R714	QRD141J-473S	"	"	"
R715	QRD141J-473S	"	"	"
R716	QRD141J-473S	"	"	"
R717	QRD149J-561S	560 Ω	"	UNF. Carbon ⚠
R718	QRD149J-561S	"	"	"
R719	QRD149J-561S	"	"	"
R720	QRD149J-561S	"	"	"
R721	QRD149J-561S	"	"	"
R722	QRD149J-561S	"	"	"
R723	QRD149J-561S	"	"	"
R724	QRD149J-561S	"	"	"
R725	QRD141J-513S	51 kΩ	"	Carbon
R726	QRD141J-513S	"	"	"
R727	QRD141J-513S	"	"	"
R728	QRD141J-513S	"	"	"
R729	QRD141J-513S	"	"	"
R730	QRD141J-513S	"	"	"
R731	QRD141J-513S	"	"	"
R732	QRD141J-513S	"	"	"
R733	QRD149J-152S	1.5 kΩ	"	UNF. Carbon ⚠
R734	QRD149J-152S	"	"	"
R735	QRD149J-152S	"	"	"
R736	QRD149J-152S	"	"	"
R737	QRD149J-152S	"	"	"
R738	QRD149J-152S	"	"	"
R739	QRD149J-152S	"	"	"
R740	QRD149J-152S	"	"	"
R741	QRD141J-104S	100 kΩ	"	Carbon
R742	QRD141J-104S	"	"	"
R743	QRD141J-104S	"	"	"
R744	QRD141J-104S	"	"	"
R745	QRD141J-104S	"	"	"
R746	QRD141J-104S	"	"	"
R747	QRD141J-104S	"	"	"
R748	QRD141J-104S	"	"	"
R801	QRD141J-393S	39 kΩ	"	"
R802	QRD141J-393S	"	"	"

⚠ : Safety Parts

Resistors

Item No.	Part Number	Rating		Description
R803	QRD149J-151S	150 Ω	1/4 W	UNF. Carbon ⚠
R804	QRD149J-151S	"	"	"
R805	QRD149J-220S	22 Ω	"	"
R806	QRD149J-220S	"	"	"
R807	QRD149J-471S	470 Ω	"	"
R808	QRD149J-471S	"	"	"
R809	QRD149J-221S	220 Ω	"	"
R810	QRD149J-221S	"	"	"
R811	QRD141J-223S	22 kΩ	"	Carbon
R812	QRD141J-223S	"	"	"
R813	QVP4A0B-222	2.2 kΩ		Variable
R814	QVP4A0B-222	"		"
R815	QRD149J-392S	3.9 kΩ	1/4 W	UNF. Carbon ⚠
R816	QRD149J-392S	"	"	"
R817	QRD149J-221S	220 Ω	"	"
R818	QRD149J-221S	"	"	"
R819	QRD149J-221S	"	"	"
R820	QRD149J-221S	"	"	"
R821	QRD141J-821S	820 Ω	"	Carbon
R822	QRD141J-122S	1.2 kΩ	"	"
R823	QRD149J-331S	330 Ω	"	UNF. Carbon ⚠
R824	QRD149J-331S	"	"	"
R825	QRD149J-182S	1.8 kΩ	"	"
R826	QRD149J-182S	"	"	"
R827	QRD141J-333S	33 kΩ	"	Carbon
R828	QRD141J-333S	"	"	"
R829	QRD149J-151S	150 Ω	"	UNF. Carbon ⚠
R830	QRD149J-151S	"	"	"
R833	QRD129J-682	6.8 kΩ	1/2W	"
R834	QRD129J-682	"	"	"
R835	QRD149J-100S	10 Ω	1/4 W	"
R840	QRV141F-12R0	12 Ω	"	Metal Film
R841	QRV141F-10R0	10 Ω	"	"
R900	QRD149J-101S	100 Ω	"	UNF. Carbon ⚠
R901	QRD149J-121S	120 Ω	"	"
R902	QRD141J-393S	39 kΩ	"	Carbon
R903	QRD141J-223S	22 kΩ	"	"
R904	QRD141J-393S	39 kΩ	"	"
R905	QRD141J-683S	68 kΩ	"	"
R906	QRD141J-222S	2.2 kΩ	"	"
R907	QRD141J-154S	150 kΩ	"	"
R909	QRD141J-333S	33 kΩ	"	"
R910	QRD141J-223S	22 kΩ	"	"
R911	QRD141J-472S	4.7 kΩ	"	"
R912	QRD141J-472S	"	"	"
R913	QRD141J-104S	100 kΩ	"	"
R914	QRD141J-124S	120 kΩ	"	"
R915	QRD141J-272S	2.7 kΩ	"	"
R917	QRD141J-271S	270 Ω	"	"
R918	QRD149J-102S	1 kΩ	"	UNF. Carbon ⚠
R919	QRD141J-683S	68 kΩ	"	Carbon
R920	QRD141J-103S	10 kΩ	"	"
R931	QRD141J-471S	470 Ω	"	"
R932	QRD141J-242S	2.4 kΩ	"	"

Others

Item No.	Part Number	Rating	Description
	E10656-001		Circuit Board
	LPSP3012NS		Ass'y Screw
	SDSB3008MCP		T. Screw
	WBS3000N		Washer
	WNS3000N		"
	E301699-001		Heat Sink
	E67764-003		Terminal
	E67764-203		"
J403	EWS014-049		4P Socket
J408	EWS014-050		"
J409	EWS015-053		5P Socket
J411	EWS084-011		4P Socket
J701	E04364-006A		6P Socket
J702	E04364-006A		"
J703	E04364-006A		"
J704	E04364-009A		9P Socket
J705	EMN00TP-402A		Pin Jack (Tuner, Aux)
J706	EMN00TP-402A		Pin Jack (Rec.-1, Tape-1)
J707	EMN00TP-402A		" (Rec.-2, Tape-2)
J708	EMN00TP-402A		" (Pre Out)
J955	EWS013-087		3P Socket
P701	E04363-006		6P Plug
P702	E04363-006		"
P703	E04363-006		"
P704	E04363-009		9P Plug
P801	E04359-004		4P Plug
P802	E04359-002		2P Plug
P803	E04359-004		4P Plug
P804	E04359-002		2P Plug
P805	E04359-004		4P Plug
P806	E04359-002		2P Plug
P901	QMV5005-004		4P Plug
P902	QMV5005-003		3P Plug
RY701	ESK2D12-212		Relay
RY702	ESK2D12-212		"
RY703	ESK2D12-212		"

3-(4) TXX-307A Tone Switch P.C. Board Ass'y

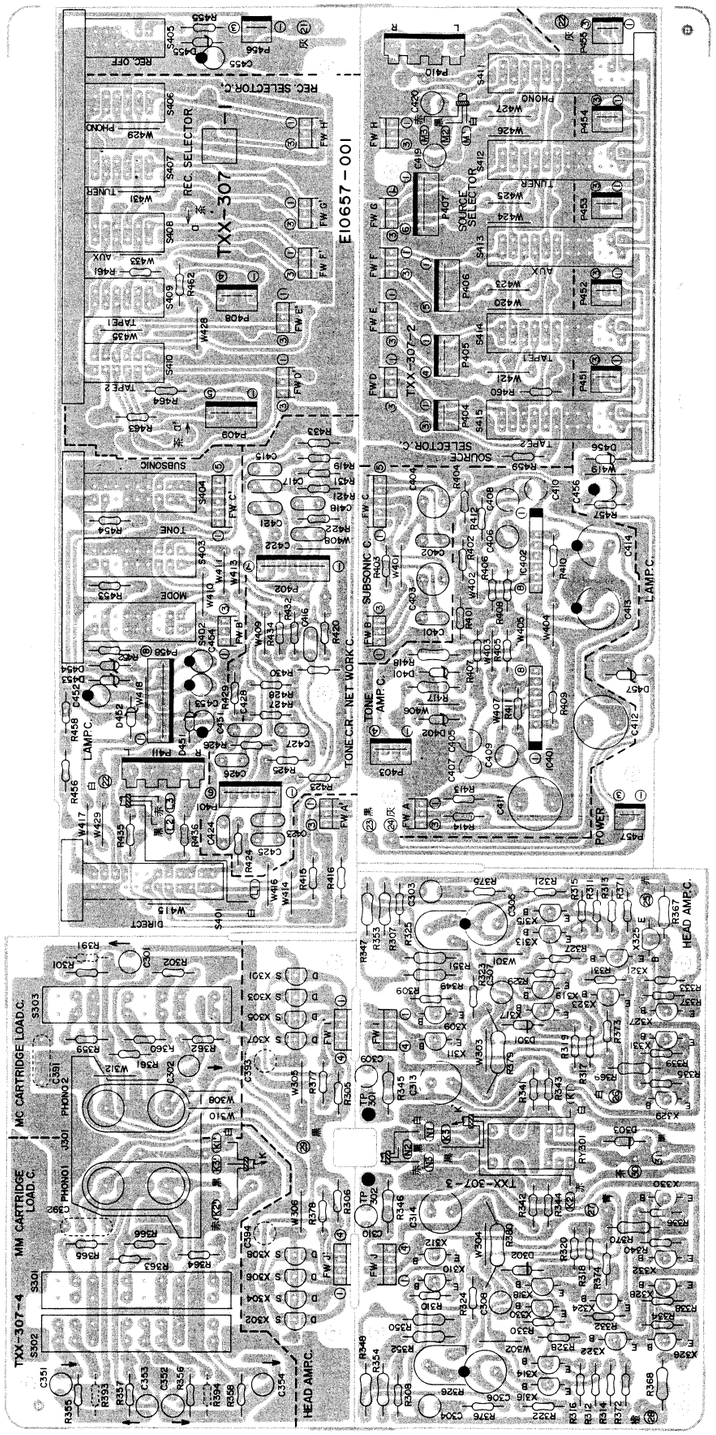


Fig. 8

Note:
The symbols (赤、黒、白 ..... etc.) on P.C. Board surface are factory process only.

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X301	2SK147-BL			Silicon	Hitachi
X302	2SK147-BL			"	"
X303	2SK147-BL			"	"
X304	2SK147-BL			"	"
X305	2SK147-BL			"	"
X306	2SK147-BL			"	"
X307	2SK147-BL			"	"
X308	2SC2235(Y)			"	"
X309	2SC2235(Y)			"	"
X310	2SC2235(Y)			"	"

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X311	2SA1084(D,E)			F.E.T.	Toshiba
X312	2SA1084(D,E)			"	"
X313	2SA872AV(D,E)			"	"
X314	2SA872AV(D,E)			"	"
X315	2SA872AV(D,E)			"	"
X316	2SA872AV(D,E)			"	"
X317	2SC1775AV(E,F)			"	"
X318	2SC1775AV(E,F)			"	"
X319	2SC2546(E,F)			Silicon	"
X320	2SC2546(E,F)			"	"

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X321	2SC1775AV(E,F)			Silicon	Hitachi
X322	2SC1775AV(E,F)			"	"
X323	2SA872AV(D,E)			"	"
X324	2SA872AV(D,E)			"	"
X325	2SC2235(Y)			"	Toshiba
X326	2SC2235(Y)			"	"
X327	2SC2235(Y)			"	"
X328	2SC2235(Y)			"	"
X329	2SA965(Y)			"	"
X330	2SA965(Y)			"	"
X331	2SA965(Y)			"	"
X332	2SA965(Y)			"	"

Integrated Circuits

Item No.	Part Number	Rating	Description
			Maker
IC401	HA12017		Hitachi
IC402	HA12017		"

Diodes

Item No.	Part Number	Rating	Description
			Maker
D301	1S2076-31		Silicon Hitachi
D302	1S2076-31		" "
D303	1S2076-31		" "
D401	HZ22-1L		Zener "
D402	HZ22-1L		" "
D451	RD5.6EB3		" NEC
D452	RD5.6EB3		" "
D453	RD5.6EB3		" "
D454	RD5.6EB3		" "
D455	RD5.6EB3		" "
D456	RD5.6EB3		" "
D457	RD5.6EB3		" "

Capacitors

Item No.	Part Number	Rating		Description
C301	QFS81HJ-682	6800 pF	50 V	Polystyrene
C302	QFS81HJ-682	"	"	"
C303	QFS81HJ-682	"	"	"
C304	QFS81HJ-682	"	"	"
C305	EEZ5001-475	4.7 μF	100 V	Electrolytic
C306	EEZ5001-475	"	"	"
C307	QFS81HJ-101	100 pF	50 V	Polystyrene
C308	QFS81HJ-101	"	"	"
C309	QFS81HJ-222	2200 pF	"	"
C310	QFS81HJ-222	"	"	"
C313	EEN1001-105	1 μF	100 V	Non-Pole
C314	EEN1001-105	"	"	"
C351	QFS81HJ-221	220 pF	50 V	Polystyrene
C352	QFS81HJ-221	"	"	"
C353	QFS81HJ-471	470 pF	"	"
C354	QFS81HJ-471	"	"	"
C401	QFM81HJ-273	0.027 μF	"	Mylar
C402	QFM81HJ-273	"	"	"
C403	EEN1001-474	0.47 μF	100 V	Non-Pole
C404	EEN1001-474	"	"	"

Capacitors

Item No.	Part Number	Rating		Description
C405	QFS81HJ-470	47 pF	50 V	Polystyrene
C406	QFS81HJ-470	"	"	"
C407	QFS81HJ-681	680 pF	"	"
C408	QFS81HJ-681	"	"	"
C409	QFS81HJ-240	24 pF	"	"
C410	QFS81HJ-240	"	"	"
C411	EEN1001-225	2.2 μF	100 V	Non-Pole
C412	EEN1001-225	"	"	"
C413	EEZ5001-475	4.7 μF	"	Electrolytic
C414	EEZ5001-475	"	"	"
C415	QFM81HJ-392	3900 pF	50 V	Mylar
C416	QFM81HJ-392	"	"	"
C417	QFM81HJ-153	0.015 μF	"	"
C418	QFM81HJ-153	"	"	"
C419	QFS81HJ-331	330 pF	"	Polystyrene
C420	QFS81HJ-331	"	"	"
C421	QFM81HJ-102	1000 pF	"	Mylar
C422	QFM81HJ-102	"	"	"
C423	QFM81HJ-332	3300 pF	"	"
C424	QFM81HJ-332	"	"	"
C425	QFM81HJ-223	0.022 μF	"	"
C426	QFM81HJ-223	"	"	"
C427	QFM81HJ-683	0.068 μF	"	"
C428	QFM81HJ-683	"	"	"
C451	QET51AR-476	47 μF	10 V	Electrolytic
C452	QET51AR-476	"	"	"
C453	QET51AR-476	"	"	"
C454	QET51AR-476	"	"	"
C455	QET51AR-476	"	"	"
C456	QET51AR-476	"	"	"

Resistors

Item No.	Part Number	Rating		Description
R301	QRV141F-1000	100 Ω	1/4 W	Metal Film ⚠
R302	QRV141F-1000	"	"	"
R305	QRZ0051-3R9	3.9 Ω	"	Fusible ⚠
R306	QRZ0051-3R9	"	"	"
R307	QRD141J-123S	12 kΩ	"	Carbon
R308	QRD141J-123S	"	"	"
R309	QRD141J-242S	2.4 kΩ	"	"
R310	QRD141J-242S	"	"	"
R311	QRD141J-682S	6.8 kΩ	"	"
R312	QRD141J-682S	"	"	"
R313	QRD141J-682S	"	"	"
R314	QRD141J-682S	"	"	"
R315	QRD141J-271S	270 Ω	"	"
R316	QRD141J-271S	"	"	"
R317	QRZ0052-102	1 kΩ	"	Fusible ⚠
R318	QRZ0052-102	"	"	"
R319	QRZ0052-102	"	"	"
R320	QRZ0052-102	"	"	"
R321	QRD141J-103S	10 kΩ	"	Carbon
R322	QRD141J-103S	"	"	"
R323	QRD141J-223S	22 kΩ	"	"
R324	QRD141J-223S	"	"	"
R325	QVP4A0B-223	"		Variable
R326	QVP4A0B-223	"		"
R327	QRD141J-362S	3.6 kΩ	1/4 W	Carbon
R328	QRD141J-372S	"	"	"
R329	QRD141J-102S	1 kΩ	"	"
R330	QRD141J-102S	"	"	"
R331	QRD149J-391S	390 Ω	"	UNF. Carbon ⚠
R332	QRD149J-391S	"	"	"
R333	QRD149J-390S	39 Ω	"	"
R334	QRD149J-390S	"	"	"
R335	QRD149J-390S	"	"	"
R336	QRD149J-390S	"	"	"
R337	QRD149J-390S	"	"	"

⚠ : Safety Parts

Resistors

Item No.	Part Number	Rating		Description
R338	QRD149J-390S	39 Ω	1/4 W	UNF. Carbon ⚠
R339	QRD149J-390S	"	"	"
R340	QRD149J-390S	"	"	"
R341	QRV141F-2200	220 Ω	"	Metal Film ⚠
R342	QRV141F-2200	"	"	"
R343	QRD141J-224S	220kΩ	"	Carbon
R344	QRD141J-224S	"	"	"
R345	QRV121F-1330	133 Ω	1/2W	Metal Film ⚠
R346	QRV121F-1330	"	"	"
R347	QRV121F-1500	150 Ω	"	"
R348	QRV121F-1500	"	"	"
R349	QRV121F-1500	"	"	"
R350	QRV121F-1500	"	"	"
R351	QRV121F-1500	"	"	"
R352	QRV121F-1500	"	"	"
R353	QRV121F-2200	220 Ω	"	"
R354	QRV121F-2200	"	"	"
R355	QRD141J-105S	1 MΩ	1/4 W	Carbon
R356	QRD141J-105S	"	"	"
R357	QRD141J-105S	"	"	"
R358	QRD141J-105S	"	"	"
R359	QRV141F-1000	100 Ω	"	Metal Film ⚠
R360	QRV141F-1000	"	"	"
R361	QRV141F-10R0	10 Ω	"	"
R362	QRV141F-10R0	"	"	"
R363	QRV141F-47R0	47 Ω	"	"
R364	QRV141F-47R0	"	"	"
R365	QRV141F-1000	100 Ω	"	"
R366	QRV141F-1000	"	"	"
R367	QRD129J-102	1 kΩ	1/2W	UNF. Carbon ⚠
R368	QRD129J-102	"	"	"
R369	QRD129J-102	"	"	"
R370	QRD129J-102	"	"	"
R371	QRD149J-102S	"	1/4 W	"
R372	QRD149J-102S	"	"	"
R373	QRD149J-102S	"	"	"
R374	QRD149J-102S	"	"	"
R375	QRD141J-5R6S	5.6 Ω	"	Carbon
R376	QRD141J-5R6S	"	"	"
R377	QRD141J-222S	2.2 kΩ	"	"
R378	QRD141J-222S	"	"	"
R379	QRG027J-152	1.5 kΩ	2 W	O.M.Film ⚠
R380	QRG027J-152	"	"	"
R401	QRD141J-334S	330 kΩ	1/4 W	Carbon
R402	QRD141J-334S	"	"	"
R403	QRD141J-275S	2.7MΩ	"	"
R404	QRD141J-275S	"	"	"
R405	QRD141J-152S	1.5 kΩ	"	"
R406	QRD141J-152S	"	"	"
R407	QRD141J-181S	180 Ω	"	"
R408	QRD141J-181S	"	"	"
R409	QRD141J-433S	43 kΩ	"	"
R410	QRD141J-433S	"	"	"
R411	QRD141J-472S	4.7 kΩ	"	"
R412	QRD141J-472S	"	"	"
R413	QRD141J-224S	220 kΩ	"	"
R414	QRD141J-224S	"	"	"
R415	QRD141J-560S	56 Ω	"	"
R416	QRD141J-560S	"	"	"
R417	QRD129J-152	1.5 kΩ	1/2W	UNF. Carbon ⚠
R418	QRD129J-152	"	"	"
R419	QRD141J-102S	1 kΩ	1/4 W	Carbon
R420	QRD141J-102S	"	"	"
R421	QRD141J-112S	1.1 kΩ	"	"
R422	QRD141J-112S	"	"	"
R423	QRD141J-153S	15 kΩ	"	"
R424	QRD141J-153S	"	"	"
R425	QRD141J-431S	430 Ω	"	"
R426	QRD141J-431S	"	"	"
R427	QRD141J-472S	4.7 k	"	"

⚠ : Safety Parts

Resistors

Item No.	Part Number	Rating		Description
R428	QRD141J-472S	4.7 kΩ	1/4 W	Carbon
R429	QRD141J-750S	75 Ω	"	"
R430	QRD141J-750S	"	"	"
R431	QRD141J-472S	4.7 kΩ	"	"
R432	QRD141J-472S	"	"	"
R433	QRD141J-152S	1.5 kΩ	"	"
R434	QRD141J-152S	"	"	"
R435	QRV141F-2200	220 Ω	"	Metal Film ⚠
R436	QRV141F-2200	"	"	"
R452	QRD141J-390S	39 Ω	"	Carbon
R453	QRD141J-390S	"	"	"
R454	QRD141J-390S	"	"	"
R455	QRD141J-390S	"	"	"
R456	QRD141J-470S	47 Ω	"	"
R457	QRD141J-2R2S	2.2 Ω	"	"
R458	QRD141J-560S	56 Ω	"	"
R459	QRD141J-221S	220 Ω	"	"
R460	QRD141J-221S	"	"	"
R461	QRD141J-151S	150 Ω	"	"
R462	QRD141J-151S	"	"	"
R463	QRD141J-151S	"	"	"
R464	QRD141J-151S	"	"	"

: Safety Parts

Others

Item No.	Part Number	Rating	Description
	E10657-001		Circuit Board
J101	EWS084-009		4P Socket Ass'y
J102	EWS084-015		"
J301	EMN00TP-402A		Pin Jack (phono)
J502	EWS084-012		4P Socket
J602	EWS014-052		"
J801	EWS084-010		"
J802	EWS082-006		2P Socket
J901	EWS014-054		4P Socket
J902	EWS013-090		3P Socket
J951	EWS013-088		"
J952	EWS013-091		"
P401	QMV5005-006		6P Plug
P402	QMV5005-007		7P Plug
P403	QMV5005-004		4P Plug
P404	QMV5005-003		3P Plug
P405	QMV5005-004		4P Plug
P406	QMV5005-005		5P Plug
P407	QMV5005-006		6P Plug
P408	QMV5005-004		4P Plug
P409	QMV5005-005		5P Plug
P410	E04359-004		4P Plug
P411	E04359-004		"
P451	QMV5005-003		3P Plug
P452	QMV5005-003		"
P453	QMV5005-003		"
P454	QMV5005-003		"
P455	QMV5005-003		"
P456	QMV5005-003		"
P457	QMV5005-003		"
P458	QMV5005-008		8P Plug
S301	QSS4301-012		Slide Switch (Cartridge Load)
S302	QSS4301-012		Slide Switch (Cartridge Load)
S303	QSS4301-012		Slide Switch (Cartridge Load)
S401	QST5101-E01		Push Switch (Direct)
S402	QSP0239-011		" (Tone)
S405	QSP0269-002		" (Rec. Select)
S411	QSP0259-160		" (Source Select)
RY301	ESK8D24-211		Relay

4. Packing Materials and Part Numbers

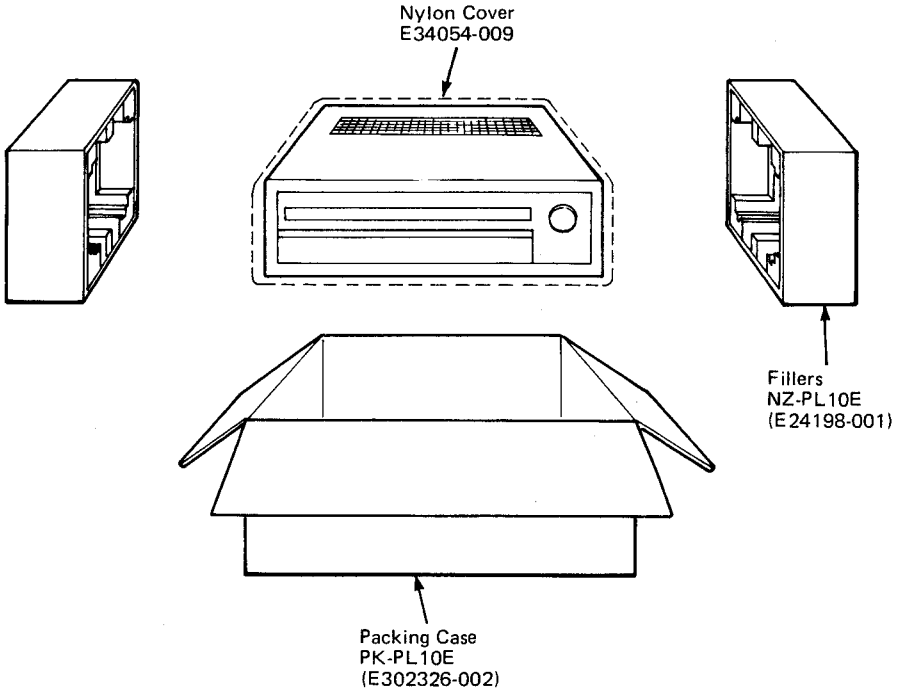


Fig. 9

5. Accessories List

Description	U.S.A.	Europe	U.K.	Other Countries
Instruction Book	E-30580-936A	E30580-936A	E30580-936A	E30580-936A
" (Dutch & Spanish)	–	E30580-1048A	–	E30580-1048A
Warranty Card	BT20048	–	BT20013C	–
Signal Cord	E03760-001	E03760-001	E03760-001	E03760-001
Driver	E69205-001	E69205-001	E69205-001	E69205-001
Polishing Cloth	E65660-001	E65660-001	E65660-001	E65660-001
Service Information Card	BT20046	–	–	–
Safety Instruction Sheet	BT20044D	–	–	–
Fuse Primary ⚠	–	–	–	QMF61U1-2R5 (110/120 V, 2.5 A) or QMF61U1-1R25 (220/240 V, 1.25 A)
Fuse Label	–	–	–	E66188-031 (2.5 A) or E66188-032 (1.25 A)
Free-Up Belt	E03709-001	E03709-001	E03709-001	E03709-001
Envelope (for Instruction Book)	E41202-2	E41202-2	E41202-2	E41202-2
" (for Warranty Card)	E66416-003	–	–	–
" (for Fuse)	–	–	–	E41202-1
" (for Power Cord)	QPGA012-03505	QPGA012-03505	QPGA012-03505	QPGA012-03505

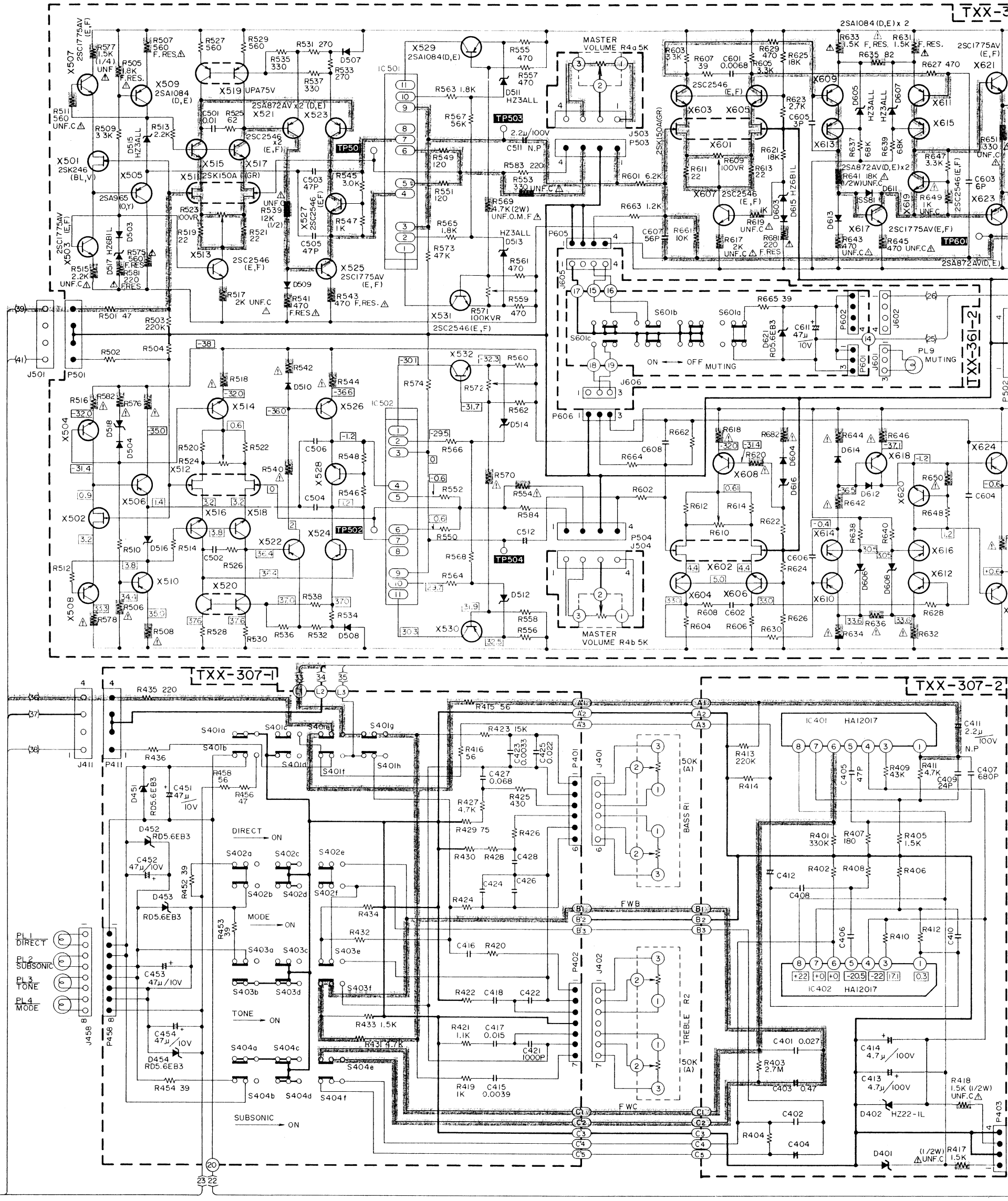
⚠ : Safety Parts

6. Parts List with Specified Numbers for Designated Areas

Description	U.S.A.	Europe	U.K.	Other Countries
Power Switch ⚠	QSP1110-310	QSP1106-002	QSP1106-002	QSP1106-002
Power Cord ⚠	QMP1700-244	QMP3900-200	QMP9017-008	QMP1700-244
Siemens Plug ⚠	–	–	–	E04056
AC Outlet ⚠	QMC0637-004	–	–	QMC0637-004
Mask Plate for AC Outlet	–	E65494-002	E65494-002	–
Mask Plate for Voltage Selector	E66196-001	E66196-003	E66196-003	–
Fuse (F001) ⚠	QMF61U1-2R5 (120 V, 2.5 A)	QMF51A2-R80L (220 V, T800 mA)	QMF51A2-R80L (220 V, T800 mA)	QMF61U1-2R5 (110/120 V, 2.5 A) or QMF61U1-1R25 (220/240 V, 1.25 A)
Fuse Socket ⚠	QMG0201-003	QMG0301-003	QMG0301-003	QMG0201-003
Rating Plate	–	E66860-030	E66860-031	E66860-029
Equalizer P.C. Board Ass'y	TXX-305B	TXX-305D	TXX-305D	TXX-305B
Volume Amp. P.C. Board Ass'y	TXX-361B	TXX-361C	TXX-361C	TXX-361B

⚠ : Safety Parts

P-L10 Schematic Diagram


TXX-3
TXX-361-2
TXX-307-1
TXX-307-2
MASTER VOLUME R4a 5K
MASTER VOLUME R4b 5K
ON ⟷ OFF MUTING
PL9 MUTING
IC 501
IC 502
IC401 HA12017
IC402 HA12017
TP501
TP502
TP503
TP504
TP601
X501 2SK246 (BL,V)
X502
X503 2SC1775AV (E,F)
X504
X505 2SA965 (O,Y)
X506
X507 2SC1775AV (E,F)
X508
X509 2SA1084 (D,E)
X510
X511 2SK150A (GR)
X512
X513 2SC2546 (E,F)
X514
X515
X516
X517
X518
X519 UPA75V
X520
X521 2SA872AV x2 (D,E)
X522
X523 2SC2546 x2 (E,F)
X524
X525 2SC1775AV (E,F)
X526
X527 2SC2546 (E,F)
X528
X529 2SA1084(D,E)
X530
X531 2SC2546(E,F)
X532
X601
X602
X603
X604
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X606
X607 2SC2546 (E,F)
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X617 2SC1775AV(E,F)
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X619
X620
X621
X622
X623
X624
2SA1084(D,E) x 2
2SA872AV(D,E)x2
2SA872AV(D,E)
2SC2546(E,F)
2SK150A(GR)
J501
P501
J503
P503
J504
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P602
J606
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J411
P411
J401
P401
J402
P402
J458
P458
P403
S601a
S601b
S601c
S401a
S401b
S401c
S401d
S401e
S401f
S401g
S401h
S402a
S402b
S402c
S402d
S402e
S402f
S403a
S403b
S403c
S403d
S403e
S403f
S404a
S404b
S404c
S404d
S404e
S404f
DIRECT → ON
MODE → ON
TONE → ON
SUBSONIC → ON
PL1 DIRECT
PL2 SUBSONIC
PL3 TONE
PL4 MODE
FWB
FWC
BASS R1
TREBLE R2
50K (A)
D501 HZ3ALL
D502 HZ3ALL
D503
D504
D505 HZ3ALL
D506 HZ6B1L
D507
D508
D509
D510
D511 HZ3ALL
D512
D513 HZ3ALL
D514
D515 HZ3ALL
D516
D517 HZ6B1L
D518
D601 HZ6B1L
D602 HZ3ALL
D603
D604
D605 HZ3ALL
D606
D607 HZ3ALL
D608
D609 HZ3ALL
D610 HZ6B1L
D611
D612
D613
D614
D615 HZ6B1L
D616
D621 RD5.6EB3
D451 RD5.6EB3
D452 RD5.6EB3
D453 RD5.6EB3
D454 RD5.6EB3
D401
D402 HZ22-1L
R501 47
R502
R503 220K
R504
R505 1.8K F.RES.
R506
R507 560 F.RES.
R508
R509 3.3K
R510
R511 560 UNF.C
R512
R513 2.2K
R514
R515 2.2K UNF.C
R516
R517 2K UNF.C
R518
R519 22
R521 22
R523 100VR
R525 62
R527 560
R529 560
R531 270
R533 270
R535 330
R537 330
R539 12K (1/2)
R541 470 F.RES.
R542
R543 470 F.RES.
R544
R545 3.0K
R547 1K
R548
R549 120
R551 120
R553 330 UNF.C
R555 470
R557 470
R559 470
R561 470
R563 1.8K
R565 1.8K
R567 56K
R569 4.7K(2W) UNF.O.M.F
R571 100KVR
R573 47K
R574
R575 560 F.RES.
R577 1.5K (1/4) UNF
R581 220 F.RES.
R582
R583 220
R584
R601 6.2K
R602
R603 3.3K
R604
R605 3.3K
R606
R607 39
R608
R609 100VR
R610
R611 22
R612
R613 22
R614
R615 HZ6B1L
R617 2K UNF.C F.RES
R618
R619 1K UNF.C
R620
R621 18K
R622
R623 2.7K
R624
R625 18K
R626
R627 470
R628
R629 470
R630
R631 1.5K F.RES.
R632
R633 1.5K F.RES.
R634
R635 82
R636
R637 68K
R638
R639 68K
R640
R641 18K (1/2W)UNF.C
R642
R643 470 UNF.C
R644
R645 470 UNF.C
R646
R647 3.3K
R648
R649 1K UNF.C
R650
R651 330 UNF.C
R652
R661 10K
R662
R663 1.2K
R664
R665 39
R680 220 F.RES
R681
R682
R435 220
R436
R451
R452 39
R453 39
R454 39
R456 47
R458 56
R401 330K
R402
R403 2.7M
R404
R405 1.5K
R406
R407 180
R408
R409 43K
R410
R411 4.7K
R412
R413 220K
R414
R415 56
R416 56
R417 1.5K
R418 1.5K (1/2W) UNF.C
R419 1K
R421 1.1K
R422
R423 15K
R424
R425 430
R426
R427 4.7K
R428
R429 75
R430
R431 1.5K
R432
R433 1.5K
R434
C501 0.01
C502
C503 47P
C504
C505 47P
C506
C601 0.0068
C602
C603 6P
C604
C605 3P
C606
C607 56P
C608
C609 2.2μ/100V N.P
C610 2.2μ/100V N.P
C611 47μ/10V
C612 2.2μ/100V N.P
C401 0.027
C402
C403 0.47
C404
C405 47P
C406
C407 680P
C408
C409 24P
C410
C411 2.2μ/100V N.P
C412
C413 4.7μ/100V
C414 4.7μ/100V
C415 0.0039
C416
C417 0.015
C418
C421 1000P
C422
C423 0.0033
C424
C425 0.022
C426
C427 0.068
C428
C451 47μ/10V
C452 47μ/10V
C453 47μ/10V
C454 47μ/10V
2.2μ/100V
C511 N.P
C512
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TXX-361-1
TXX-306-1(1/2)
TXX-361-2
TXX-307-2
TXX-306-1(1/2)
Power Supply Circuit
Refer to designated areas.
Power Supply Circuit
Voltage Selector Connection
110V
120V
220V
240V
TOP VIEW
(J) (U) (J) For U.S.A.
(U) For Other Countries
(E) (B) (E) For Europe
(B) For U.K.
TXX-306-1
TXX-361B-3
TXX-305B-3
TXX-361C-3
LINE VOLTAGE SELECTOR
AC OUTLETS
SWITCHED
UNSWITCHED
FOR OTHER COUNTRIES
FOR EUROPE
FOR UNITED KINGDOM
FUSE RATING (F1)
RATING
LINE VOLTAGE
2.5A
1.25A
T800mA
AC 110V~ 50/60Hz
AC 120V~ 50/60Hz
AC 220V~ 50/60Hz
AC 240V~ 50/60Hz
AC 220V~ 50Hz
AC 240V~ 50Hz

P-L10 Schematic Diagram

A
B
C
1
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TXX-307-4
TXX-307-3
TXX-306-2
TXX-306-1 (1/2)
TXX-306-3
TXX-305-1
TXX-305-2
TXX-307-1
PHONO1
PHONO2
J301
S301a
S301b
S302a
S302b
S303a
S303b
2SK147(BL)x8
X301 X303 X305 X307
X302 X304 X306 X308
FW I
FW J
J704
J705
J703
J706
J702
J707
J708
P704
P703
P702
TUNER
AUX
TAPE I
REC I
TAPE 2
REC 2
PRE OUT
RY701
RY702
RY703
J701
J956
P956
J951
P951
J955
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J952
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J954
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S901a
S901b
S902a
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MM
MC
PH1
PH2
PHONO SELECTOR
REC SELECTOR
ON
REC
PHONO
TUNER
AUX
TAPE 1
TAPE 2
S405a
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TP301
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X1969
X1970
X1971
X1972
X1973
X1974
X1975
X1976
X1977
X1978
X1979
X1980
X1981
X1982
X1983
X1984
X1985
X1986
X1987
X1988
X1989
X1990
X1991
X1992
X1993
X1994
X1995
X1996
X1997
X1998
X1999

C
D
E
F
1
2
3
4
TXX-307-1
TXX-307-2
REC SELECTOR
SOURCE SELECTOR
PHONO
TUNER
AUX
TAPE1
TAPE2
POWER
BALANCE
FWH
FWG
FWF
FWE
FWD
REC1
REC2
PL5 REC ON
PL10
PL11
PL12
PL13
PL14
PL15
J404 TAPE2
J405 TAPE1
J406 AUX
J407 TUNER